

**COSTS ASSOCIATED WITH PROVIDING SCHOOL
MEALS FOR CHILDREN WITH SPECIAL FOOD
AND NUTRITION NEEDS**

by

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PREFACE

We believe that every child will have the opportunity to enjoy the benefits of effective Child Nutrition Programs, with healthy food choices, provided in pleasant surroundings served by compassionate and empowered people.

Many children bring special food and nutrition needs into the school, and often these special needs are not adequately addressed in Child Nutrition Programs (CNP). Consistent with the vision of the National Food Service Management Institute (NFSMI) that **ALL** children have the benefits of CNP, the NFSMI has been an advocate for providing appropriate meals to children with special needs. Research and education efforts have been implemented by the NFSMI to support CNP professionals in meeting these needs.

The NFSMI completed one national study to assess the number and types of special food and nutrition needs that exist in schools. Additional information was needed about costs and labor time involved in providing for these special needs, thus, this study was conducted using a case study research method to collect food cost and labor time information. Fifteen schools in eight districts were included in the study. The districts represented three states in the Southeast and Southwest, U. S. Department of Agriculture regions.

There are two important contributions of this study. The method, developed and validated in this study, provides a model for CNP professionals to use in costing nutrition services provided by schools. The recommendations of the study suggest ways district school nutrition directors/supervisors can improve the administrative processes related to providing special meals.

Dr. Martha Conklin and Dr. Mary Frances Nettles conducted this study. Case study research is very time consuming and requires lots of days "on the road." We think the results of this study are significant and well worth the time, energy, and expertise required to complete the study. This study would not have been possible without the commitment of Dr. Conklin and Dr. Nettles and the staff from the **eight school districts**. Time and expertise was required of these district school nutrition directors, school nutrition managers, and staff in collecting data. Because of our promise of confidentiality in handling the data, we cannot identify them by name but we want them to know how much we are indebted to them. **Dr. Mary Gregoire** reviewed and edited the final report and provided technical assistance on development of the flowcharts. **Lisa Barrett, Shonia Gipson,** and



Joni Guthrie provided excellent assistance with developing tables and graphs, typing, and revising the final report. We appreciate all of the many contributions that made this project a success.

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EXECUTIVE SUMMARY



COSTS ASSOCIATED WITH PROVIDING SCHOOL MEALS FOR CHILDREN WITH SPECIAL FOOD AND NUTRITION NEEDS

EXECUTIVE SUMMARY

Overview of the Study

The Rehabilitation Act of 1973, the Individuals with Disabilities Education Act (IDEA) of 1990, and the Americans with Disabilities Act of 1990, are the laws upon which federal requirements for providing nutrition services to children with special needs are based. The U.S. Department of Agriculture (USDA) issued Section 504 Guidance Instructions in 1982 which established that school food service operations funded by USDA must provide meals at no extra charge to children requiring meals tailored to special food and nutrition requirements.

There is little information about how these regulations have been implemented, especially in relation to cost. One national study conducted by the National Food Service Management Institute surveyed district school nutrition directors/supervisors and school nutrition managers to estimate the costs associated with furnishing meals to children with special needs. Findings indicated that there was a wide range of costs associated with serving these children.

The objectives of this study were to describe the administrative and production processes that occur when school nutrition programs provide meals to children with special food and nutrition needs and to investigate the indirect and direct costs associated with providing these meals. An additional objective was to develop a model for identifying indirect and direct costs per special meal. Indirect costs were labor costs associated with the administration of the special meals program in each school and district. Direct costs were food and labor costs directly related to the production of special meals.

The research used a case study methodology. Eight school districts from three states in the Southeast and Southwest USDA regions participated in the study. The median student enrollment in the districts was 22,250, and the median number of schools in the districts was 36. On-site data collection occurred for two days in each of the 15 schools within the eight districts. Food service employees continued to collect cost data for four more days. Median enrollment in the 15 schools was 666, and the median number of meals served to children with special food and nutrition needs in the schools visited was six.



Major Study Findings

Research Objective:

Describe the administrative and production processes that occur when providing meals for children with special food and nutrition needs. Findings:

- ◆ District school nutrition directors/supervisors and school nutrition managers addressed five issues related to the provision of special meals after parents requested this type of meal: obtaining written medical authorization for special meals, interpreting the physician's written diet order, purchasing special food products and equipment, training school nutrition employees, and determining whether children who need special meals are present in school on a given day.
- ◆ The efficiency with which these issues were resolved appeared to be related to the amount of administrative labor associated with providing special meals.

Research Objective:

Determine the indirect and direct costs associated with preparing and serving meals to children with special food and nutrition needs. Findings:

- ◆ District indirect labor costs. This labor included the time of district school nutrition directors/supervisors, area supervisors, dietitians, and clerical staff in the district office. Total district labor varied from a little over 1 hour to approximately 55 hours per month. The median for all eight districts was 12 hours per month. Exact labor costs depended on the salaries of the individuals.
- ◆ District direct labor costs. Only one district school nutrition director/supervisor reported hiring a registered dietitian to help with special meals. This labor amounted to approximately 4 hours per child requiring a special meal. No direct labor costs at the district level were incurred for the remaining districts.
- ◆ District direct food and equipment costs. The median cost of foods purchased for special meals each month by the eight district school nutrition services was \$20. Foods typically purchased were sugar-free or low sodium items designated for children receiving diabetic or low sodium meals. One district, however, was purchasing canned nutritional supplements at a cost of \$704 per month for approximately 15 children. The median equipment expenditure was \$125 per year. Blenders and food processors were the types of equipment most commonly purchased.



- ◆ **School indirect labor costs.** Fifteen school nutrition managers estimated that they spent a median of 6 hours each month in administrative duties associated with providing meals for children with special needs. The indirect labor time per child with a special food and nutrition need ranged from 2 minutes per child to approximately 3 hours per child. The median value was 1 hour per child per month. Exact labor costs depended on the salaries of the managers.
- ◆ **School direct labor costs.** Labor time was recorded for the preparation of meals in two categories: pureed meals (including all types of consistency modifications) and all other special meals (tube feedings, diabetic, low sodium, etc.). The median times required to puree meals were 4 and 6 minutes for breakfast and lunch, respectively. Other special meals required median preparation times of 5 minutes for breakfast and 8 minutes for lunch. Special meals in three schools were assembled and transported to remote serving sites. The amount of time required to assemble and/or transport meals varied from 30 seconds to 2 minutes per meal depending on the type of transportation system used. Exact costs associated with direct labor time depended on the type and number of special meals produced and the salaries of food production employees.
- ◆ **School direct food costs.** Meal food costs were compared at each school by calculating the difference between the food cost of regular meals and the food cost of each of two types of special meals: pureed and other special meals. There was no median difference in cost between pureed and regular breakfasts, and the pureed lunches were \$.01 less than the cost of regular lunches. The median difference between the cost of regular and other special breakfasts was \$.05 less for special meals. Similarly, the median cost of other special lunch meals was \$.01 less than the cost of regular meals, even though one school had costs of other special lunch meals consisting of canned nutritional supplements that were \$1.83 (290%) more than the cost of regular lunches. In general, there was little difference between the food cost of regular and special meals, but if special food products such as nutritional supplements were purchased, the impact on cost was dramatic.
- ◆ **Summary of costs.** Twelve hours per month of indirect labor time were associated with district staff administering the special meals program. No direct labor costs were incurred at the district level. Direct food costs at the district level were \$20 per month. Equipment expenditures at the district level were \$125 per year. A total of six hours per month or 1 hour per child per month of manager's time was associated with providing special meals. Direct labor times in the schools were 4 and 6 minutes of additional labor to prepare each pureed breakfast and lunch meal, respectively. Other special meals required preparation times of 5 minutes for breakfast and 8 minutes for each lunch meal. There was no difference in average food cost between pureed and regular breakfasts. Pureed lunches cost \$.01 less, on average, than regular lunches. The average cost of other special breakfast meals was \$.05 less than regular breakfasts, and the average cost of other special lunch meals was \$.01 less than the cost of regular lunches.



Research Objective:

Develop a model for identifying direct and indirect costs per meal associated with providing school nutrition services to children with special food and nutrition needs. Findings:

- ◆ **Costs associated with providing meals for children with special food and nutrition needs can be ascertained using the methodology of this study.**

Conclusions

The provision of special meals was not a costly undertaking for the group of eight districts included in this case study research. Some districts incurred more costs than others. Recommendations from this research concentrate on improving administrative processes so labor and food costs can be minimized.

Recommendations

The following recommendations for district school nutrition directors/supervisors focus on ensuring that special food and nutrition needs are met by using administrative processes that minimize costs, particularly indirect labor costs and food costs:

- ◆ **Recognize that children with special food and nutrition needs exist in all school districts and develop plans to produce their meals with a minimum use of resources.**
- ◆ **Notify parents, teachers, and health care professionals about the procedures necessary for children to receive modified meals. This should include providing standard forms for the physician to authorize special diets in writing.**
- ◆ **Implement the American School Food Service Association's Nutrition Integrity Standards. Achieving these standards will minimize costs by enabling school nutrition personnel to modify meals for children with special needs within the menus served to all children.**
- ◆ **Establish a system for services of a registered dietitian or other qualified nutrition professional who has the expertise to plan modified menus and suggest food production techniques to effectively provide meals for children with special needs. This professional may be employed full-time in school nutrition programs, or the district may contract for these services as needed.**
- ◆ **Clarify the school district's policy on purchasing canned nutritional supplements, other special food products, blenders, and special eating utensils. Explore other sources of funds such as special education and Medicaid.**



- ◆ Continuously train all school nutrition personnel on types of special diets and menu and recipe modifications that must be made to meet the needs of children requiring special meals. This should be group training for all employees that is scheduled in addition to the on-site training that takes place when meals for a unique special diet are produced.
- ◆ Using the model, calculate the costs associated with the provision of special meals in order to obtain objective information for decision making.

Additional Research

Additional research is needed to test whether the findings of this case study can be generalized to other school districts in the nation. Future research efforts also should include nutritional analyses of regular and modified meals.





NATIONAL FOOD SERVICE MANAGEMENT INSTITUTE

COSTS ASSOCIATED WITH PROVIDING SCHOOL MEALS FOR CHILDREN WITH SPECIAL FOOD AND NUTRITION NEEDS

Federal requirements to assure that Child Nutrition Programs (CNP) are made available to children with special food and nutrition needs have been legislated since the early 1970's. The Rehabilitation Act of 1973 and the Individuals with Disabilities Education Act (IDEA) of 1990, formerly the Education of the Handicapped Act of 1975, are the laws upon which federal requirements for providing nutrition services to children with special needs are based. Section 504 of the Rehabilitation Act prohibits discrimination against individuals with disabilities participating in federally-assisted programs and activities, including Child Nutrition Programs. IDEA requires states to provide early intervention services to infants and toddlers with disabilities and free and appropriate public education for children with disabling conditions. IDEA and Section 504 strengthen each other by emphasizing the importance of educating children with disabilities alongside peers without disabilities and by underscoring the fact that education and related services, including medically prescribed meal modifications, must be provided without altering costs to parents (Reeder, Hinshaw, & Dixon-Doss, 1994).

The U.S. Department of Agriculture (USDA) issued Section 504 Guidance Instructions in 1982. This guidance requires school nutrition programs funded by the USDA to provide meals at no extra charge to children requiring special diets. This mandate has presented challenges for school nutrition programs, especially related to cost and the availability of trained food service staff.

Several state or regional studies have been conducted to determine the need for dietary modifications in school food service. Results indicate that the most common conditions requiring special diets are food allergies, diabetes, and a variety of disorders that necessitate texture modifications (Gandy, Yadrick, Boudreaux, & Smith, 1991; Gould, Shanklin, & Gorman, 1987; Horsley, 1988; Robinson, 1993). Blyler and Lucas (1987) identified financing as an important consideration for assuring appropriate nutrition services since feeding children with special needs often requires special foods, nutritional formulas, and adaptive feeding devices. Little research has been done to examine the cost of providing special food and nutrition services within a school food service operation.

The National Food Service Management Institute (NFSMI) conducted a nationwide survey in 1993 (Yadrick & Sneed) to determine the number and types of special diets and diet modifications required by children with special needs who attended schools that participated in the USDA-funded programs, the administrative requirements for meeting special needs of children, and costs involved in providing these meals. Over 650 school nutrition managers, district school nutrition directors/supervisors, and district special education directors responded to the study questionnaire. Findings indicated that a majority of the school nutrition managers (54%) had at least one child in their schools with



special food and nutrition needs. The medical conditions reported most frequently by all groups included food allergy, food intolerance, diabetes, and conditions with which feeding problems were associated. Menu modification and feeding assistance to children were the primary services provided by school nutrition programs. Special education program directors identified nutrition assessment and assistance with feeding children as the two food and nutrition services that were most needed. A small percentage (< 25%) of school nutrition or special education personnel used consultation from a registered dietitian.

The equipment most often purchased included microwave ovens, blenders, food processors, juicers, and food grinders. The estimated costs associated with these purchases ranged from \$18 to \$300. Feedings devices and utensils purchased included special utensil grips, plates, mugs, straws, and trays. The cost of these utensils was estimated at \$6 to \$100 per item. Special food purchases included items such as food thickeners, pureed foods, reduced fat products, and liquid nutritional supplements. Additional time was needed to provide special food and nutrition services for tasks such as preparing food, pureeing food, and assisting with feeding children. This additional time was estimated at 2 to 75 minutes per meal. Concomitant labor costs depended on the salary levels of individuals doing the tasks.

The survey by Yadrick and Sneed was the first nationwide study to address, through retrospective estimate, the costs associated with providing food and nutrition services to children with special needs. In order to study the issue of cost further, research scientists at the NFSMI designed an investigation using a case study methodology to collect data on the actual food and labor costs incurred by district school nutrition programs providing meals for these children. Specific objectives were to:

- ◆ describe the administrative and production processes that occur when providing meals for children with special food and nutrition needs,
- ◆ determine the indirect and direct costs associated with preparing and serving meals to children with special food and nutrition needs, and
- ◆ develop a model for identifying indirect and direct costs per meal associated with providing school nutrition programs to this population.

METHOD

A case study method with structured interviews and observations was used to determine the food and labor costs associated with providing school meals for children with special food and nutrition needs. This method allowed researchers to maintain a holistic view of the process. A holistic approach was deemed appropriate because guidelines had not been issued from the USDA detailing how schools participating in CNP should handle the provision of meals for children with special needs. School nutrition programs had been designing systems to meet the needs of these children on an individual



basis as situations arose. Broadly defined research objectives allowed these variations to be explored and documented.

Costs were categorized in this study as indirect or direct. Indirect costs were those primarily associated with the administration of the special meals program. This included the labor of district school nutrition directors/supervisors, school nutrition managers, and others such as food buyers and secretaries involved in administrative operations. The labor of these employees was categorized as indirect because these employees were not directly preparing special meals. There were no indirect food costs associated with providing meals to children with special needs. Direct costs were those directly related to the production of special meals. This included production labor and food. Labor time of consulting dietitians hired specifically to work with special needs also was considered direct labor.

Case Study Sites

District school nutrition directors/supervisors in three states from the Southeast and Southwest USDA regions were telephoned to determine if meals for children with special food and nutrition needs were being served. A district school nutrition director/supervisor was asked to participate in the study if the district served a minimum of 20 meals to children with special dietary needs. At least half of these meals were to be served to children with conditions other than milk allergies. The proposed research method was mailed to the district directors/supervisors immediately after determining that they qualified for the study and were interested in participating. Follow-up telephone calls were made approximately one week later to answer questions and schedule data collection. Menus for the study period were mailed to research scientists at NFSMI prior to data collection so that the complexity of the data collection process could be anticipated, and forms to be used for data collection could be individualized.

The research was designed to collect data in the school nutrition programs district office and in two elementary schools where special meals were prepared. Elementary schools were targeted because younger school children need considerable guidance in making appropriate food choices, and modified meal preparation would tend to be more prevalent at this level. The objective was to elicit cooperation from districts that had sufficient experience with serving special diet meals to warrant investigation of food and labor costs. Some districts also were chosen because their system for handling special meals represented a specific type of food delivery system such as satellite service from a base kitchen, or because they had a unique method for monitoring special diets such as the use of computers to flag children who should be receiving a special meal.

Research Instruments

Four instruments were developed for on-site data collection. Two were structured interview forms and two were used to collect cost information.



Structured Interview-Director

A structured interview form was developed to record the responses of the district school nutrition director/supervisor (Appendix A). Questions were designed to gather information about policies and procedures related to providing meals to children with special needs and estimates of direct and indirect costs incurred at the district level for these meals (Appendix A).

Indirect Labor Costs

The primary information on indirect labor costs at the district level was an estimate by the district school nutrition director/supervisor of his/her time per month devoted to:

- ◆ acquiring the physician's written diet order.
- ◆ communicating with principals, teachers, family members, students, managers, and food service staff and documenting all steps taken to accommodate children with special needs participating in the school nutrition program.
- ◆ meeting with special education teachers to develop Individualized Education Plans (IEPs).
- ◆ working with registered dietitians (RDs) to plan special meals, planning the meals, or working with parents to choose appropriate meals for their children.
- ◆ getting bids on special food or equipment items.
- ◆ coordinating the training of food service staff.

In addition to this time estimate, the director was asked to supply information on other district personnel who spent time on activities related to providing meals to children with special needs; e.g. area supervisors, secretaries, or other professional staff members. Area supervisors in a few large districts, who were assigned the responsibility for administering the procedures for children with special needs, were interviewed directly.

Direct Labor Costs

The district school nutrition director/supervisor was asked whether a RD or nutritionist had been hired by the district to formulate the nutrition component of the IEP, counsel students and their families, or plan special menus for the students. If a RD had been hired, the district director/supervisor was asked to supply information on the number of hours worked in relation to the number of children served.



Direct Food and Equipment Costs

Additional questions on the structured interview form asked for information concerning direct food and equipment costs at the district level associated with serving children with special needs. Many of these questions were taken from the NFSMI survey on the same topic (Yadrick & Sneed, 1993). Questions addressed the costs associated with modifications to the cafeteria serving lines or dining rooms and the purchase of food production equipment, special eating utensils, and food specifically designated for special diets.

Demographics

The district school nutrition director/supervisor was asked to estimate the number of children with special food and nutrition needs in her/his district for whom specific services were provided. Other information requested was district enrollment, number of schools, percent free and reduced meals in the district, district educational policies with regard to disabled children, and professional qualifications of the managers in the two schools where data were collected.

Structured Interview-Manager

A similar structured interview form was developed for the manager in charge of each school where data were collected (Appendix B, p.55). This interview identified tasks associated with nutrition management of children with special needs and estimated indirect labor time from the viewpoint of the school nutrition manager. Managers also were asked other questions regarding procedures used to modify meals for children with special needs.

Labor Cost Recording Form

A form was developed to record the labor time required to prepare special meals (Appendix C). Labor minutes used to puree food were recorded separately from the time required to prepare other diets such as low sodium, diabetic, or lactose-intolerant diets. If modified meals were assembled and transported to remote serving sites, the labor time to assemble and transport these meals was recorded also. Breakfast and lunch labor times were recorded separately.

Menu Cost Recording Form

A menu cost recording form was developed on which the regular menus and any special diet menus, sent to NFSMI prior to the study, were pre-recorded before initiating data collection (Appendix D). The form was completed and/or corrected during data collection by the school nutrition managers. It was used by NFSMI research scientists to calculate food costs for regular, pureed, and other special diets. Additional forms for recipe costing and menu item costing were developed to help the research scientists calculate food costs (Appendix E).



Pilot Study

All instruments and data collection procedures were pilot tested in a small school district with one elementary school involved in serving meals to children with special food and nutrition needs. Research scientists recorded data and trained employees for one day of production. The manager and food service employees in the school continued to collect data for four additional days. NFSMI research scientists met with the district school nutrition program director/supervisor and school manager after data collection was complete to critique the research process and format of the instruments. Several changes for purposes of clarity were made in the structured interviews and cost forms as a result of this process. Complete data were obtained from the pilot test, and the decision was made to include this district in the total results of the study.

Data Collection

On-site data collection occurred over a two-day period in each district. NFSMI research scientists interviewed the district school nutrition director/supervisor and district-level staff on the first day of data collection. Copies of food and supply bids as well as labor cost information were obtained from the district director/supervisor. The research scientists also went to the two schools scheduled for data collection to meet the school nutrition managers and determine a time for data collection the next day. If the district had a school specifically devoted to teaching children with developmental disabilities, data were collected in this school as well as in one other elementary school where children with special food and nutrition needs were included.

On the second day, each research scientist collected data at one school in the district. Preparation of special meals for breakfast and lunch were observed at each school. Managers and food service employees were instructed on the research protocol for recording the labor time used in preparing these meals. Managers were interviewed concerning indirect labor costs, and they were instructed on recording data on actual food served for the calculation of both regular and special meal food costs.

Data collection procedures were designed to continue for four days after the day of training with the NFSMI research scientists. Personnel in both schools were instructed on procedures for recording food and labor cost information for the remaining consecutive days of data collection. Mailing instructions for the labor and food cost data were clarified with the district school nutrition director/supervisor. Each district was given a postage-paid return envelope for mailing data to the NFSMI as soon as the information was assembled.

Labor Minutes Per Meal

The labor time required to prepare meals for children with special food and nutrition needs was recorded for five consecutive days in each school. Special forms (Appendix C) were provided on a clipboard. A digital clock and pencil were affixed to each clipboard. The labor time used to prepare pureed meals, which included other consistency modifications such as ground, was kept separately



from the time required to prepare other special meals such as tube feedings, diabetic, low sodium, or food allergy meals. Pureed meals were prevalent in schools with students in special education classes, and in some instances, were the only type of special meal produced by school nutrition programs. Employees were instructed to record the time when they started to assemble equipment and food for preparation tasks. Similarly, they were instructed to record the time they stopped preparation immediately after the work area was clean and all equipment put away. The labor time to assemble and transport modified meals to a remote serving site also was recorded separately if the school was involved in this type of system.

Total labor time spent in special meal preparation was calculated by NFSMI research scientists by subtracting the difference between the start and stop times. This difference represented the labor minutes required to prepare the special meals. Space also was provided to record the number of meals that were prepared during this time. In most instances, the labor time represented labor in addition to that required to prepare a regular meal. For example, when recording time for pureed meals, the same food that was served to children receiving a regular meal was altered in consistency after the items were fully prepared. The labor minutes included time to transport the prepared items and the food processing equipment to the work station, puree the food, package the pureed portions, and store the food in a temperature-controlled environment until it was served to the child.

Regular and Special Meal Food Costs

The school nutrition managers were requested to record on the menu recording form (Appendix D) the actual food served to students receiving regular and special meals. Emphasis was placed on accurately recording the meals so that a valid comparison could be made between the cost of the various types of meals. Portion sizes, if different from the standard CNP portion, also were noted. Space was provided on the form to list portion costs, if portion costs were available in the district.

Costing Procedures

Regular and special meal food costs were calculated by NFSMI research scientists using cost information provided by the districts, with the exception of one district whose staff chose to calculate food costs. Three cost averages were calculated based on five days of data collection: regular meals, pureed meals, and an average of all other special meals such as diabetic, low fat, and low sodium. Each district school nutrition director/supervisor provided recipes, production records, or daily issue/withdrawal sheets for the five days of data collection. Food cost calculation procedures used recipe costs, costs of convenience items, costs derived from production or issue/withdrawal sheets, or a combination of these. Assumptions implicit to the costing process were as follows:

- ◆ The information on the menu recording form was an accurate reflection of the food served to children receiving regular or modified meals.



- ◆ Modified meals were altered in food and/or nutrient content to be in compliance with medical prescriptions; otherwise, USDA meal patterns were followed, portions were maintained, and adequate calories were provided.
- ◆ Standardized recipes supplied by the district, State Department of Education, or USDA were used during data collection.
- ◆ Costs supplied by the districts were accurate.
- ◆ Food purchased by the district conformed to standard yield information as supplied by the *Food Buying Guide for Child Nutrition Programs* (USDA, 1990) and *Food for Fifty* (Shugart & Molt, 1993).
- ◆ USDA commodities had no reported associated cost. This assumption was based on the fact that districts were not consistent in allocating shipping/storage costs to USDA commodities. Rather than be inconsistent with the manner in which commodities were valued, "no cost" was assumed.
- ◆ Information supplied on production records or issue/withdrawal sheets was an accurate reflection of quantity, pack, and form of food used.

Data Analysis

Both quantitative and qualitative data were collected requiring a variety of data analysis techniques. Qualitative information from the structured interviews were summarized. Range of values, means and standard deviations, and medians were calculated for all cost data. Median values were reported because this measure of central tendency or average is preferred when there are a few very high or very low values (outliers) in the data. The median is a more conservative picture of the average because it is not influenced by these outliers.

District and School Indirect Costs

Estimates by district school nutrition directors/supervisors and school nutrition managers of the administrative time used to provide meals to children with special needs were summed for each district and each school. Indirect labor time at the district level was calculated as the sum of estimated time the director, professional staff, and clerical staff spent in administering the provision of special meals. The indirect labor time at each school was calculated as the sum of the estimated time of the school nutrition manager and clerical staff in the school involved in this same process. Means and standard deviations were calculated for all schools in the study. Labor time was used as a proxy for labor costs throughout this study. The exact cost of indirect labor would be a function of the salaries of the individuals involved.



School Direct Costs

Direct Labor Costs

A labor time per meal was calculated for pureed and other special meals. Mean labor time was calculated for the two schools in each district and for all fifteen schools in the study. Labor time was used as a proxy for direct labor costs. The exact cost of direct labor would be a function of the salaries of the food service employees involved.

Direct Food Costs

Regular food costs were compared at each school with two categories of food costs for special meals: mean food costs for pureed meals and mean food cost for all other special meals such as diabetic and low sodium. The formula used for the cost comparison was as follows:

$$\text{Food cost comparison (\$/meal)} = \text{average cost of special meals} - \text{average cost of regular meals}$$

The cost of the regular meals was subtracted from the cost of the special meals so that the comparison would show as a positive value if the special meal were more expensive. If the value were negative, the special meal would be less expensive than the regular meal. The cost comparison expressed as a percentage was calculated using the following formula:

$$\text{Food cost comparison (\%/meal)} = ((\text{average cost of special meals} - \text{average cost of regular meals}) / \text{cost of regular meals}) \times 100$$

The resulting percentage was positive if special meals were more expensive, and negative if special meals were less expensive than regular meals. Mean food cost comparisons for each district and for all schools in the study were determined.

RESULTS AND DISCUSSION

Case Study Sites

Four school districts in major cities and three located in small towns participated in the study. Data from the small district that volunteered for the pilot study also were included, making a total of eight districts. Selected characteristics of the school districts and the schools visited within each district are listed in Table 1. The range of data, means and standard deviations, and median values are reported. Specific information about each district and its schools is reported in Appendix F.

The median enrollment in the districts was 22,250 children, and the median number of schools in the districts was 36. Two schools in each district participated in the study with the exception of only one school in the small district that served as the pilot. Median enrollment in the 15



Table 1. Selected characteristics of school districts and schools within the districts chosen as case study sites

Characteristic	Range		Mean	S.D.	Median
	Min	Max			
District ^a					
Enrollment	2,375	109,000	38,323	41,002	22,250
No. schools	4	151	58	59	36
% Free lunch	32	88	66	19	67
% Reduced lunch	4	11	7	3	7
Schools ^b					
Enrollment	214	1,000	623	258	666
No. special meals	2	47	9	11	6

^aN=8^bN=15

schools was 666. The size of the schools was similar to a previous NFSMI national study where the median enrollment was 625 students (Yadrick & Sneed, 1993). The median number of meals served to children with special food and nutrition needs was six.

The type and number of meals produced in the schools for children with special food and nutrition needs are listed in Table 2. The maximum number of children who received specific types of modified meals, means and standard deviations, and median values are reported. Most schools prepared pureed meals, and meals tailored for specific food allergies were fairly prevalent. In general, schools prepared very few special meals other than those modified in consistency.



Table 2. Type and number of meals produced for children with special food and nutrition needs (N=15 schools)

Special Meal	Maximum ^a	Mean	S.D.	Median
<-----number of children----->				
Consistency Modifications:				
Pureed/Ground	27	5	7	2
Other Special Modifications:				
Tube Feeding	5	0	1	0
Diabetic	2	0	1	0
Low Calorie	1	0	0	0
High Calorie	11	1	3	0
Low Fat/Cholesterol	1	0	0	0
Low Sodium	1	0	0	0
Low Protein	1	0	0	0
Milk Allergy	3	1	1	0
Other Food Allergies	6	1	2	1
Between Meal Snacks	1	0	0	0
Other	1	0	0	0

^a The minimum was zero in all cases.

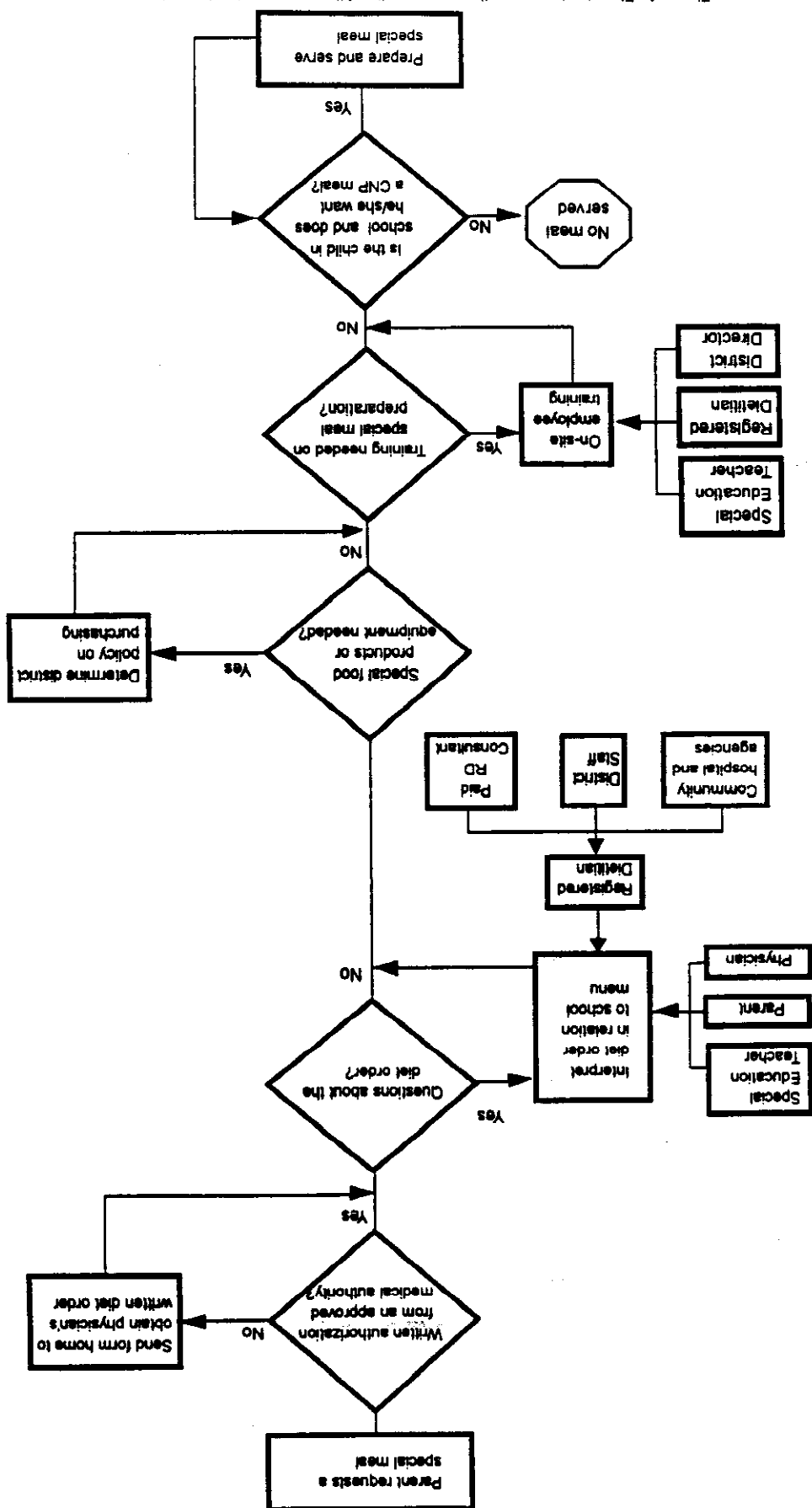
Administrative and Production Processes Associated with Providing Special Meals

Each district school nutrition service had developed procedures to handle modified meal requests, and each district's procedures are described in detail (Appendix F). Figure 1 illustrates a composite of the processes that occur in many of the districts. As shown on the flowchart, parents initiate the process by requesting a special meal. This request usually comes to the principal, the school nurse, or the school nutrition manager. Some district school nutrition directors/supervisors had publicized this type of service by sending letters to parents stating that special meals were available. Other directors talked with pediatricians and family practitioners in the community to inform them of the availability of modified meals as part of school nutrition programs.





Figure 1. Flowchart representing a composite of the current school nutrition programs processes involved in providing meals for children with special food and nutrition needs.



Written Authorization

After the request for a special meal is made, five issues have to be resolved before the child can be served (Figure 1). The first issue is to determine if written authorization from an approved medical authority was submitted with the request for a special meal. The physician is the approved authority in most instances, but a school nurse or special education teacher might be the person who authorizes special meals for children who are enrolled in special education classes. If a written diet order is not submitted with the special meal request, there usually is a form available to give to parents. Parents take the form to their family physician who uses it to record specific diet order information. The completed form, in turn, is given to the school nutrition manager who contacts the district office for further instructions. An exception happens when the special meal request is made by a special education teacher for a meal modified in consistency only. The manager may not contact the district office but instead works with the special education teacher to produce the meal at the appropriate consistency.

Interpretation of Written Diet Order

The second issue to be addressed is whether the written diet order can be interpreted and/or produced correctly by school nutrition programs. Many times the diet order needs to be more complete in terms of the type of food and nutrients necessary to meet the needs of the child. Usually the district school nutrition director/supervisor takes the responsibility to find an individual to interpret the diet order. The physician who wrote the diet order may be called for further explanation. Parents and special education teachers are a source of information about the special meals, provided they have an understanding of the diet and nutritional composition of food.

Registered dietitians are an excellent source to provide information on interpreting diet orders and modifying meals to meet the specific food and nutrition needs of children. The district school nutrition director/supervisor may be a registered dietitian (RD), but in most instances in this study, she was not. A nationwide survey of district school nutrition directors/supervisors reported that approximately 10% of directors/supervisors are registered dietitians (Gregoire & Sneed, 1994).

Help from a registered dietitian can be obtained from several sources. Many large districts have at least one RD on staff in the district office and this individual can be assigned the responsibility to interpret diet orders, plan or mark menus, and train employees regarding special meals. Two districts in this study had assigned RDs, who were employed at the district level, the responsibility for special meals. Dietitians who work in local hospitals and community agencies usually are helpful in interpreting diet orders, and they may have sample menus to share. All districts in this study used *gratis* time from dietitians in the community. Consulting RDs can be hired on a fee-for-service basis to provide these services. One district had hired a registered dietitian to help with special meals this school year. Yadrick and Sneed (1993) found that less than 25% of school nutrition or special education personnel in the districts surveyed used consultation from a registered dietitian.



Finding an appropriate individual to interpret the diet order correctly is vitally important because most school nutrition managers are not qualified in this area. One out of 15 managers in this study was a registered dietitian and another manager, in the same district, had a baccalaureate degree. The remaining managers had high school degrees or less. Previous research found that 6% of school nutrition managers had college degrees (either 2-yr. or 4-yr. degrees) and 63% had only high school education (Sneed & White, 1993).

All district school nutrition directors/supervisors reported that the school nutrition managers were given primary responsibility to assure that special meals were produced according to the diet order. In some districts, food service assistants were assigned this responsibility. Yadrick and Sneed (1993) found that 86% of school nutrition managers and 72% of district school nutrition directors/supervisors stated that food service staff had the responsibility for making menu modifications. Managers need to be trained and provided sufficient technical information to be able to perform effectively and efficiently in the supervision of special meal preparation.

Purchase of Food and Equipment

The third issue to be resolved is whether special food products or equipment need to be purchased before the special meals can be produced. District policy on source of funding is important to decision making. The policy in one district dictated that no special foods could be purchased. All meal modifications were made with food supplied through normal purchasing channels, and canned nutritional supplements were furnished by special education. Some districts maintained a policy that any food necessary to meet the special food and nutrition needs of children would be purchased by the school nutrition program. In the latter example, food was purchased from grocery stores when only small quantities were required. The impact of these policies on food costs can be excessive.

Employee Training

A fourth issue concerns employee training. None of the districts participating in this study had trained employees during the current school year on preparing meals for children with special food and nutrition needs. Two districts had conducted previous training sessions on this topic, particularly in relation to preparing meal modifications for children who are developmentally disabled.

The average school nutrition employee has limited experience in preparing meals to meet special food and nutrition needs unless they happened to have worked previously in a health care setting. Employees need to be trained in methods of pureeing or grinding food to the proper consistency. Dietitians and special education teachers can provide training in this area or information to the district school nutrition director/supervisor so she/he can train employees.

Employees also need to be trained on food composition, especially related to fat, cholesterol, and simple sugar content of food. Employees in one school served a fat-free cookie for a diabetic meal because it was a "diet cookie", not realizing that the simple sugar and calorie content of this cookie was higher than a similar cookie containing fat. This is a common mistake, and one that can be



corrected with training. Dietitians, once again, can provide training on food composition, food purchasing, and guidance on proper food production techniques for special meals.

Yadrick and Sneed (1993) reported that the three most important topics for continuing education as rated by district school nutrition directors/supervisors and school nutrition managers were understanding liability issues; calculating the amount of protein, fat, carbohydrate, and calories in menus; and modifying recipes to decrease fat, cholesterol, and/or sodium. Other research on training needs associated with producing meals for children with special needs reported similar findings (Gandy, et al., 1991; Robinson, 1993).

Attendance and Meal Verification

The fifth and final issue to be resolved in providing meals to children with special needs is whether the child is present at school and whether he/she wants a school meal. Many children requiring special meals have fragile health conditions and miss several days during the school year. The school nutrition managers in many schools check morning attendance records before asking their employees to prepare special meals. This is a time consuming process for the manager, but ultimately it saves in food and labor costs.

District Costs

District Indirect Labor Costs

Each district school nutrition director/supervisor was asked to estimate the amount of time each month spent in activities related to providing meals to children with special needs. Table 3 lists the maximum, means and standard deviations, and the median minutes per month spent in each activity for all directors. The median amount of time per month spent by district directors in activities related to communicating with students, families, principals, teachers, managers, and food service staff was approximately 2 hours (126 minutes). The 1200 minutes spent on communication by the director in District G (Appendix F) was related to the administrative procedures the district was using to provide special meals. Directors also were spending a median of 28 minutes each month on activities related to getting bids for or purchasing special food or equipment items. This time appeared to vary based on the involvement of the district director/supervisor in food and equipment purchasing decisions. Several directors in smaller school districts also were spending time securing special food items from local discount or grocery stores. None of the directors were spending any time on activities related to meeting with special education teachers to develop IEPs.



Table 3. Estimated minutes per month spent by district school nutrition directors/supervisors (N=8 districts) on activities related to providing meals to children with special food and nutrition needs

Activity	Maximum*	Mean	S.D.	Median
<-----minutes/month----->				
Acquiring physician's written diet order and communicating with physician	140	28	17	0
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	1200	335	427	126
Meeting with special education teachers to develop IEP	0	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	120	32	54	0
Getting bids on or purchasing special food or equipment items	533	107	186	28
Coordinating or conducting training of food service staff	80	18	28	5
Other activities	133	17	47	0

* The minimum was zero in all cases.



As noted in Figure 2, the total time the eight directors were spending each month in activities related to providing special meals varied from 10 minutes to over 26 hours (1603 minutes) with a median of approximately 6 hours (395 minutes). The cost of this time would depend on the salary of the director.

The director/supervisor also was asked to estimate the amount of time other district office personnel spend in activities related to providing special meals. Three districts had professional staff that included area supervisors and dietitians and five districts had clerical staff who spent time in activities devoted to providing meals to children with special needs. In some cases, area supervisors and district dietitians were interviewed by NFSMI research scientists to obtain an estimate of this time. Figure 2 shows the total minutes per month of indirect labor spent by district office personnel on activities related to providing meals to children with special food and nutrition needs. The amount of time spent by area supervisors and district dietitians varied from over 7 hours (463 minutes) to approximately 55 hours (3287 minutes) each month. Most of the professional staff's time was spent in activities related to communicating with students, families, principals, managers, and food service staff and acquiring the physician's written diet orders. One district had dietitians who met with special education teachers to develop IEPs. The amount of time spent by clerical staff on these activities varied from 23 minutes to five hours (300 minutes) each month with a median value of 25 minutes. The cost to the district would depend on the salary of the area supervisors, dietitians, or clerical staff.

The total amount of district office indirect labor varied from over 1 hour (81 minutes) in District D to approximately 55 hours (3297 minutes) per month in District F (Appendix F). The median time was 12 hours (730 minutes) each month. In districts where area supervisors were involved in activities related to providing meals to children with special needs, the director's involvement appeared to decrease. More clerical time seemed to be required in districts where the administrative procedures associated with handling modified meal requests necessitated mailing each parent a menu to alter.

District office indirect labor time per child with a special food and nutrition requirement was not calculated due to inconsistency in information provided by districts. For example, the director in one large district was not able to give a specific accounting of the number of children for whom menu modifications were being provided. The process for assuring that children with special needs were provided with meals tailored to their requirements was decentralized, and information concerning physician's written diet orders and special meal plans was held in the office of the school nutrition manager and principal at each school.

District Direct Labor Costs

District school nutrition directors/supervisors were asked whether registered dietitians or nutritionists had been hired by the districts to formulate the nutrition component of the IEP, counsel students and their families, or plan special menus for the students. One director reported that a registered dietitian



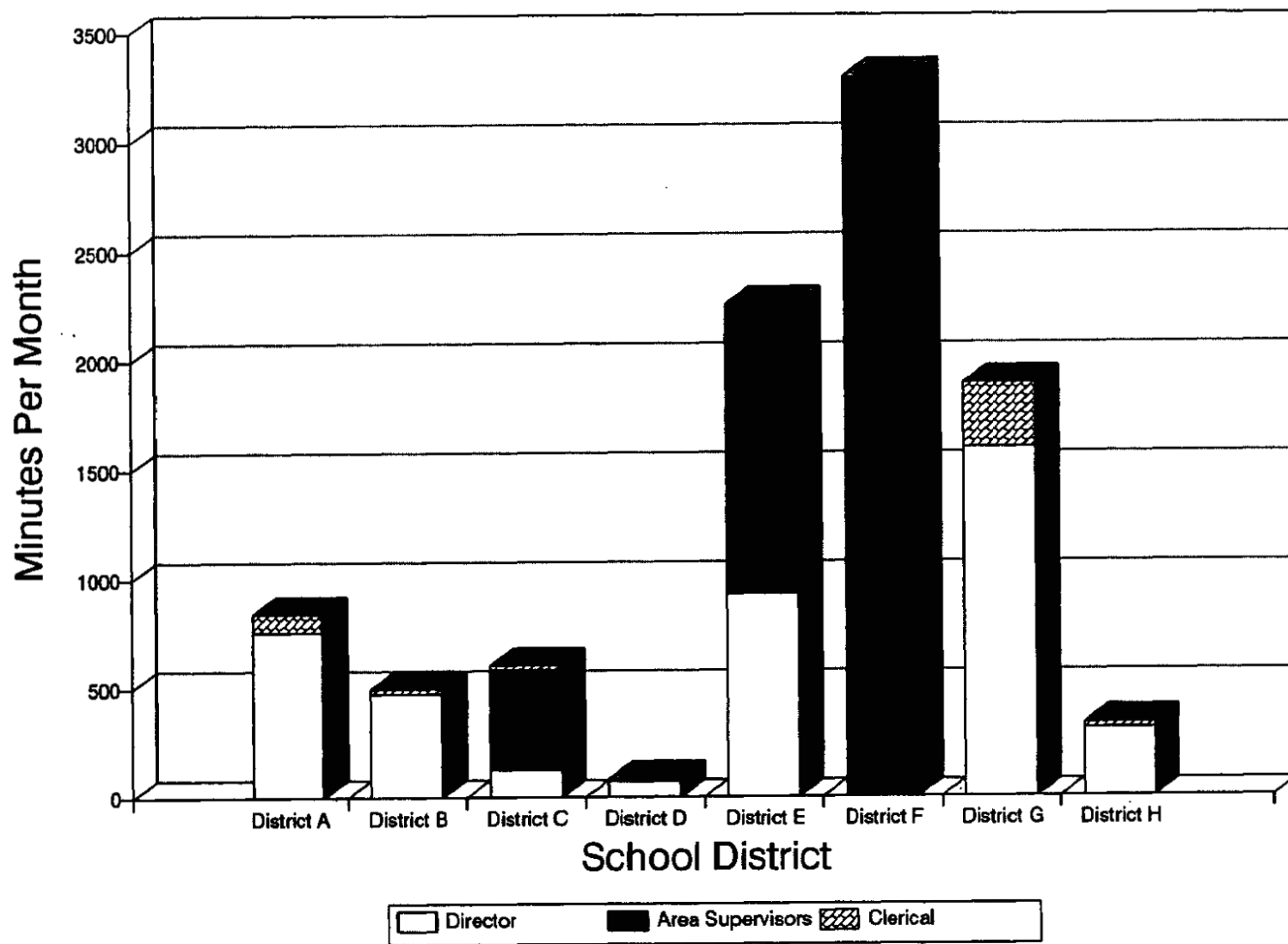


Figure 2. Estimated total indirect labor time per month spent by district personnel on activities related to providing meals to children with special food and nutrition needs

had been hired to help plan menus, counsel families, and train food service employees. The consulting time in this district amounted to approximately 4 hours per child per month of direct labor at the district level. Three directors indicated that RDs are employed in the district; therefore, there are no direct labor costs in these districts associated with providing meals to children with special needs. The remaining four district directors reported that they are not contracting with registered dietitians or nutritionists. Dietitians from local hospitals, county and state health departments, State Departments of Education, and college faculty donated consulting time to school nutrition programs. They primarily served to clarify the child's medical condition, suggest procedures to follow with a specific diet, submit sample menus to use as a meal pattern, and review modified school menus for children with special food and nutrition needs. One district school nutrition program director indicated that the State Department of Education has contracted with a dietitian in a large urban medical center in the state to be "on call" to assist district personnel who encounter unfamiliar diets.

District Food and Equipment Purchases

District school nutrition directors/supervisors reported on purchases of special food and equipment to accommodate children with special needs. Table 4 shows the maximum, mean and standard deviation, and median cost for monthly food purchases and cost of equipment purchased during this school year associated with the preparation and service of meals to children with special needs. The median value of special foods purchased each month by the eight school nutrition programs was \$20. Food products typically purchased were sugar-free or low sodium items designated for children on diabetic or low sodium diets. Several districts were purchasing food products specifically for children requiring consistency modifications such as strained fruits. The eight districts had diverse policies on purchasing canned nutritional supplements and special food items. District B maintained a policy that no special foods were to be purchased for children with special needs. Any menu modifications were to be made with food available through the district's central purchasing department. District F was averaging \$704 each month on canned nutritional supplements purchased for approximately 15 children. These findings support the results of the Yadrick and Sneed study (1993) that food products such as water-packed fruit, pureed foods, and liquid supplements were being purchased to meet the special dietary needs of children. Their study, however, did not identify whether school nutrition program or other district funds were used to purchase these items.

The median equipment expenditure during the current year made by the eight district school nutrition programs was \$125 (Table 4). District directors reported that special equipment items such as microwave ovens and blenders had been purchased this school year. District B had purchased six blenders at a cost of \$1800. Costs of blenders varied depending on whether the district school nutrition programs purchased household appliances or commercial equipment. Several district directors indicated that although they had not made purchases this year, they had purchased in the past equipment such as blenders, food processors, insulated trays, and eating utensils solely for the preparation and service of special meals. One district director reported purchasing a hot/cold cart system with special trays, plates, and tables designed to accommodate wheelchairs several years ago.



Table 4. Food and equipment expenditures associated with the preparation and service of meals to children with special food and nutrition needs (N=8 districts)

	Maximum ^a	Mean	S.D.	Median
Food purchased monthly (\$)	704	156	262	20
Equipment purchased this year (\$)	1800	339	611	125

^a The minimum was zero in all cases.

No districts had made alterations to the cafeteria serving lines. These findings are consistent with the Yadrick and Sneed (1993) study which indicated that districts were purchasing blenders, food processors, microwave ovens, feeding devices, and eating utensils. Their study, however, did not identify whether school nutrition program or other district funds were used to purchase these items.

School Costs

School Indirect Labor Costs

Each school nutrition manager was asked to estimate the time she spent in activities related to providing meals to children with special food and nutrition needs. Table 5 lists the maximum, mean and standard deviation, and median minutes per month spent in each activity for all 15 school nutrition managers. None of the managers were spending any time on activities related to meeting with special education teachers to develop IEPs. The only activity for which there was a median value greater than 0 was communication. The amount of time per month spent by school managers in communication activities was 4 hours (240 minutes). The cost of this indirect labor would depend on the salary of the manager.

Figure 3 depicts the total time per month the school nutrition managers spent in administering the special meals program in each school. The median amount of total time spent by the 15 managers was over 6 hours (407 minutes) each month. The amount of indirect labor varied from 52 minutes in District A, School 2 to 2269 minutes per month in District F, School 1. There appeared to be no relationship between the amount of time spent by managers administering the special needs program and the number and complexity of special meals.



Table 5. Estimated minutes per month spent by school nutrition managers on activities related to providing meals to children with special food and nutrition needs (N=15 schools)

Activity	Range		Mean	S.D.	Median
	Min	Max			
<hr/>					
	<hr style="border-top: 1px dashed black;"/> <div style="text-align: center;"><-----minutes/month-----></div>				
Acquiring the physician's written diet order and communicating with physician	0	240	23	63	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	20	1800	382	470	240
Meeting with special education teachers to develop IEP		0	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	120	29	46	0
Securing special food or equipment	0	160	26	49	0
Coordinating training for food service staff or participating in workshop conducted by others	0	360	27	92	0
Providing assistance in feeding children	0	40	3	10	0
Observing consumption of special diets	0	480	46	123	0



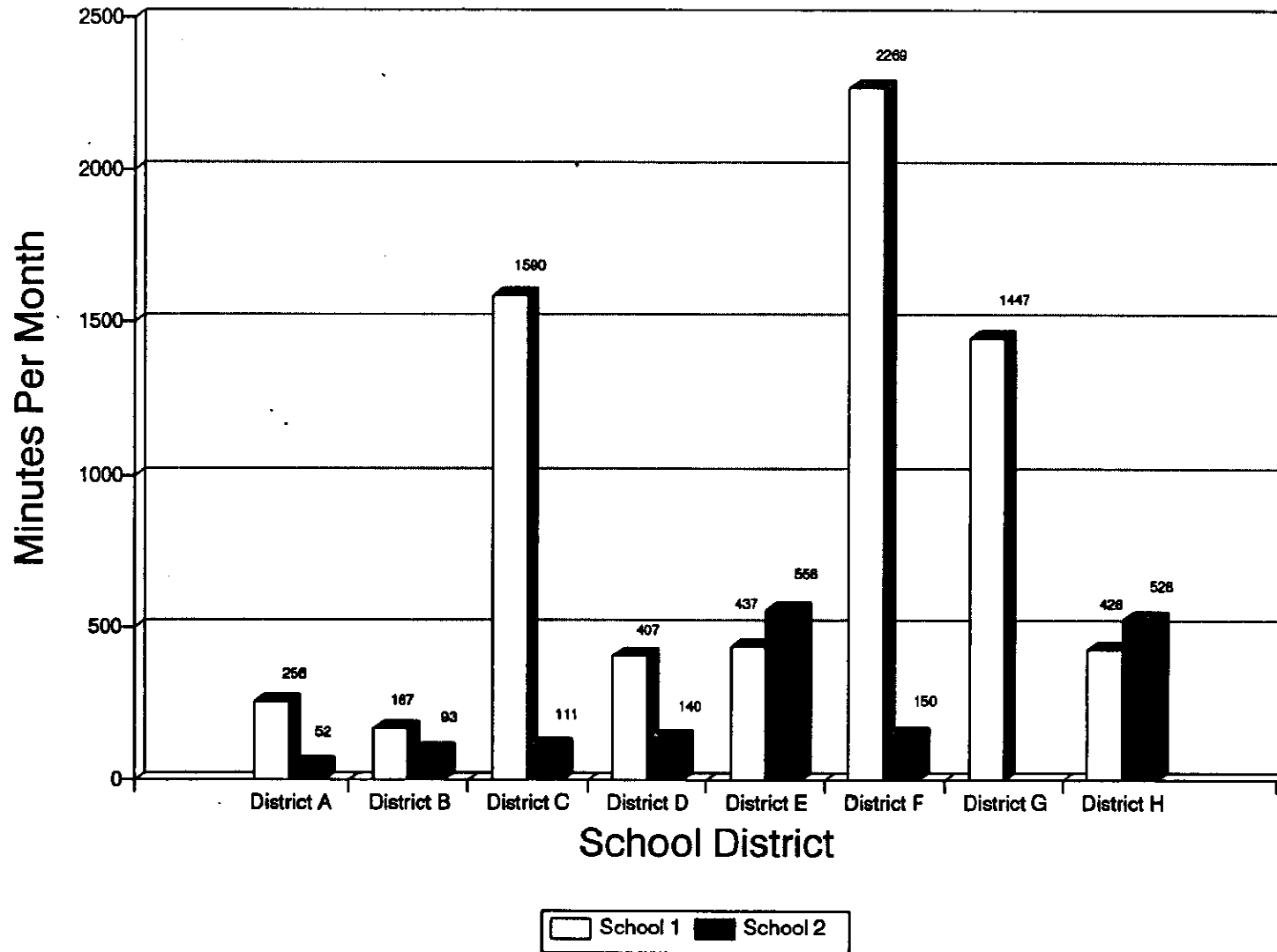


Figure 3. Estimated total indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special food and nutrition needs

Figure 4 indicates the amount of the manager's indirect labor time per child with a special food and nutrition need for each of the 15 schools. The median value was 64 minutes per child each month. This time varied from 2 minutes per child in District B, School 2 to 378 minutes per child in District F, School 1. The time allocated to providing meals to children with special needs in District B, School 2 may have been diminished by the fact that the manager also had responsibility for a middle school kitchen. She admitted to the research scientists that the time she spent in the elementary school was limited, and she relied heavily on the judgment of a cook who had many years of experience preparing modified meals for individuals in nursing homes. The manager in District F, School 1 was particularly anxious to please parents and students who required special meals that were mostly modified for food allergies. She took the time each morning to make sure that each child was in school and to check with them regarding what they would like to eat for lunch given the posted menu. She appeared to be accommodating student food preferences within the constraints of time and resources.

School Direct Labor Costs

The labor time required to prepare meals for children with special food and nutrition needs was recorded for five consecutive days in each school. Food service employees also recorded the number of meals prepared each day. The labor time used to prepare pureed meals, which included other consistency modifications such as ground, was kept separately from the time required to prepare other special meals such as tube feedings, diabetic, low sodium, or food allergy meals. Pureed meals were prevalent in schools with students in special education classes, and in some instances, were the only type of special meal produced by school nutrition programs. The range, mean and standard deviation, and median direct labor time associated with providing meals for children with special food and nutrient needs are listed on Table 6.

Table 6. Direct labor time^a in schools associated with providing meals for children with special food and nutrition needs (N=15 schools)

and nutrition needs (14-15 schools)					
Labor time	Range		Mean	S.D.	Median
	Min	Max			
	<-----minutes/meal----->				
Pureed meals ^b :					
Breakfast	1	8	4	3	4
Lunch	1	16	7	5	6
Other special meals ^c :					
Breakfast	1	19	5	3	5
Lunch	1	24	11	10	8

^a Based on a 5-day period in each school.

^b Pureed meals included all special meals modified in consistency, e.g., ground and pureed meals.

^c Other meals included all special meals modified in food and nutrient composition; e.g., tube feedings, diabetic, low sodium, and food allergy meals.



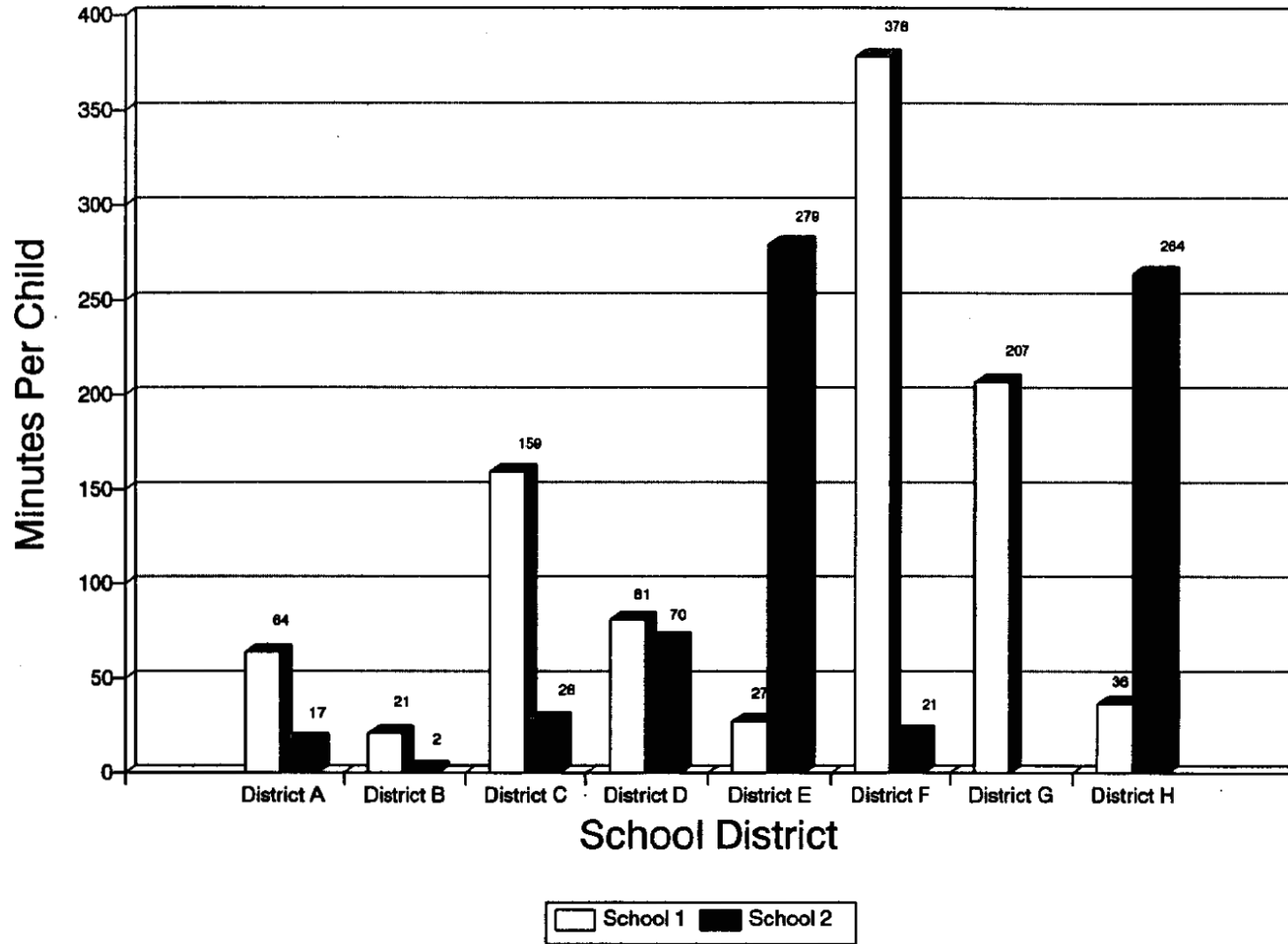


Figure 4. Indirect labor time of school nutrition managers per child receiving a special meal

Food service employees recorded the direct labor time to prepare the pureed breakfast and lunch meals. The median times to prepare pureed meals were 4 and 6 minutes for breakfast and lunch, respectively. Figure 5 portrays the labor minutes per meal associated with preparing pureed breakfast and lunch meals. No pureed meals were prepared in either of the District A schools. For schools preparing pureed breakfasts, labor time for breakfast varied from 1 minute per meal in District B, School 1 and District E, School 1 to 8 minutes per meal in District G, School 1. Labor time for pureed lunch meals ranged from 1 minute per meal in District B, School 1 to 16 minutes per meal in District G, School 1. In most instances, this labor time per meal represents labor in addition to that required to prepare a regular meal. Many of the same food items that were served to children receiving regular meals were altered in consistency after the food was fully prepared.

Employees reported the labor time required to prepare the other special breakfast and lunch meals. Other special meals had median preparation times of 5 minutes for breakfast and 8 minutes for lunch (Table 6). Figure 6 depicts the labor minutes per meal associated with the preparation of other meals such as diabetic, low fat/low cholesterol, low sodium, low protein, and food allergies. No special meals other than pureed were prepared in either of the District D schools. For schools that did prepare other special meals, labor time for other special breakfast meals ranged from 1 minute per meal in District C, School 2 to 9 minutes per meal in District H, School 2. Labor time for other special lunch meals ranged from 1 minute per meal in District B, School 1 and District F, School 2 to 24 minutes per meal in District H, School 2. The 1 minute per meal at District B, School 1 was spent in dishing pudding for special education children receiving a regular meal. The dessert on the menu was cinnamon graham crackers, and the manager thought that the special education children would have problems eating this product. This school had no other type of special meals for which preparation was required. District F, School 2 had meals categorized as "other", but the preparation required for these meals was simply the dispensing of canned nutritional supplements to be given to the children by the special education teachers. It did take, however, an average of 1 minute per meal to retrieve the supplements from the storeroom and have them ready for the special education teachers to take back to the classrooms. Employees at District H, School 2 were preparing special meals for one child on a low sodium/low potassium diet. This labor time included preparation of meals that required minimal additional production because they were based on the regular school menu and also meals that required special production of food items because they were different from the day's menu. The school nutrition manager was very concerned about the health of the child as she had been in the hospital several times in the previous months. The employees were aware of the importance of the diet to the child's health and were very conscientious in the preparation of her meals.

Figure 6 also shows that District A, Schools 1 and 2 and District C, School 2 had lower direct labor times per other special lunch meals than did Districts E, F, G, or H. District A and C had regular menus that offered choices of entrees, vegetables, and fruit every day. In many instances, limited special meal preparation was required since food items from the choice menus could be incorporated into the special meals.



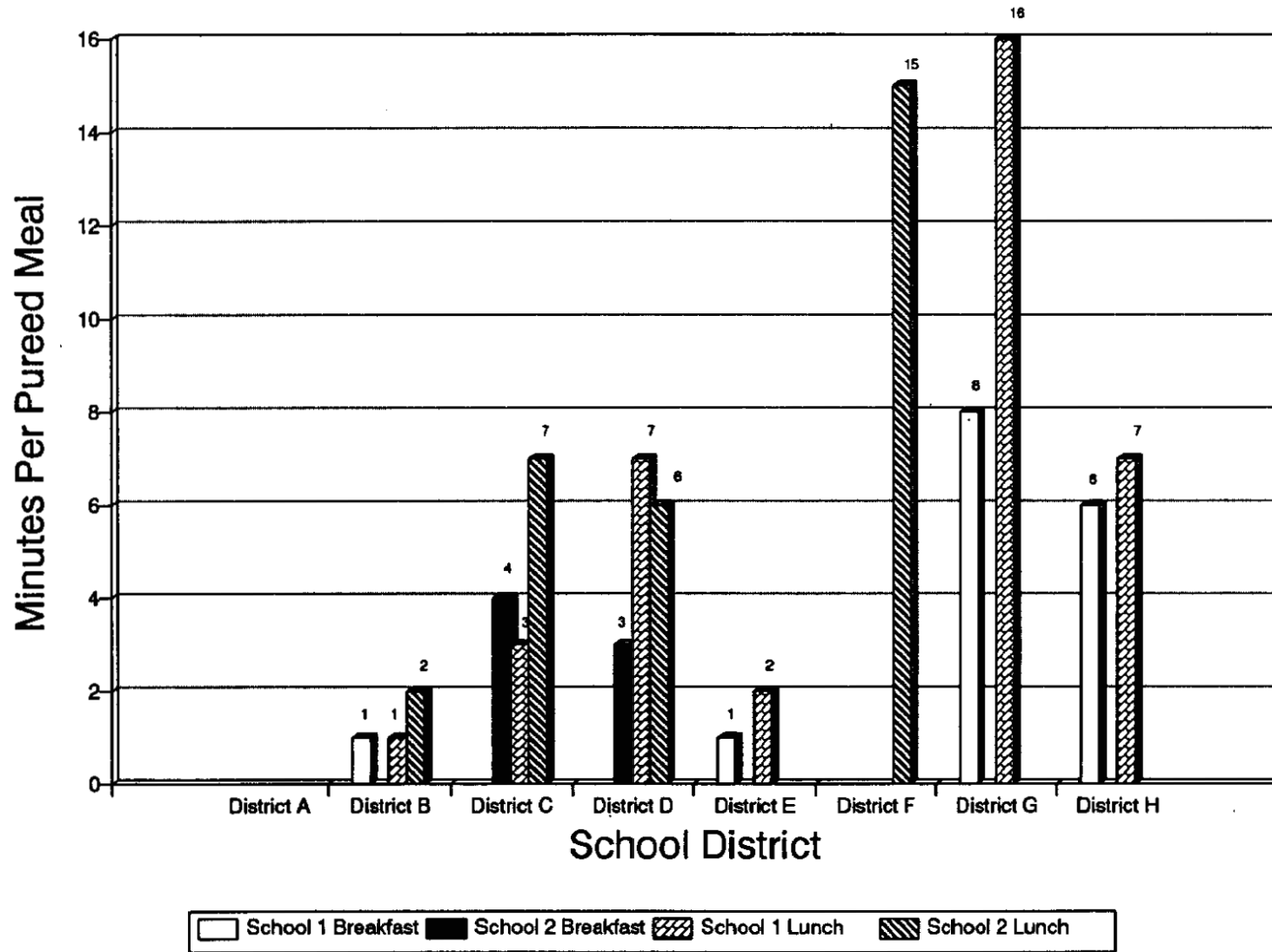


Figure 5. Labor minutes per meal for preparation of pureed breakfast and lunch meals

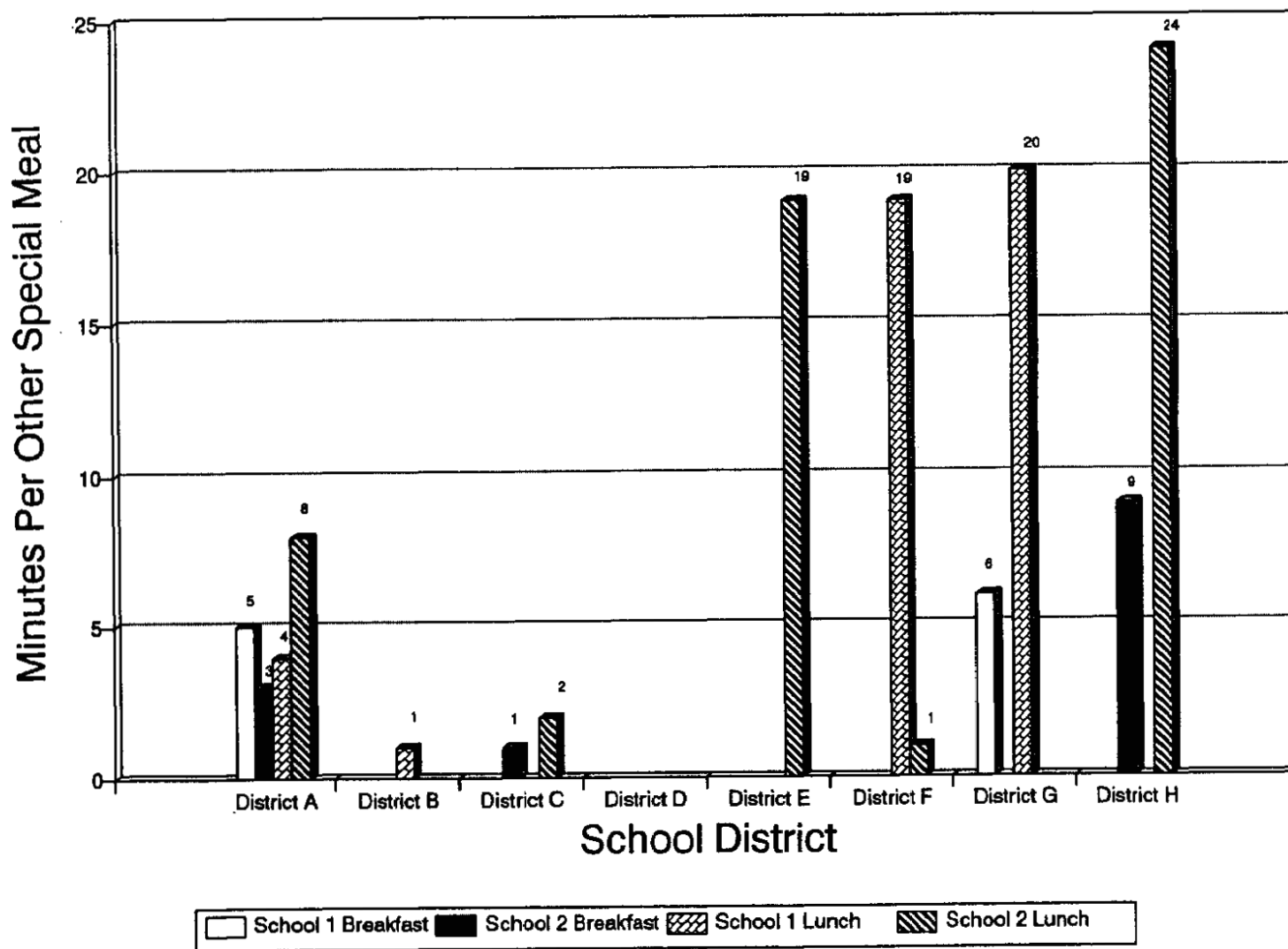


Figure 6. Labor minutes per meal for preparation of other special breakfast and lunch meals; e.g., diabetic, low fat/low cholesterol, low sodium, low protein, and food allergy

These findings are consistent with the Yadrick and Sneed (1993) study which indicated that additional time was required to provide meals for children with special food and nutrition needs. Yadrick and Sneed reported that 2 to 75 minutes of additional time was spent in food preparation tasks, including chopping, blending, and pureeing of foods. Food service personnel also spent extra time preparing alternative items and using alternative cooking methods.

Additional labor time was required in three school districts for the assembly and delivery of regular and pureed meals to special education classrooms or remote facilities. In District B, School 2, the reported labor time associated with breakfast was the time used to transport the breakfast cart to the school and serve the children. The average transport time for breakfast was 1 minute per meal. All regular and special lunch meals sent to the satellite school were assembled on a trayline and transported in an enclosed, heated cart. Three employees were involved in the trayline assembly and loading of meals in the cart. The average transport time for lunch was 1 minute per meal. In District D, School 1, all regular and pureed lunch meals were placed in disposable inserts for insulated trays to be transported. Items such as crackers, fresh fruit, milk, and juice were packed in boxes. A driver from the satellite facility picked up the trays and other food items each morning. The average assembly time was 2 minutes per meal. Additional labor was reported in District H, School 1 for the delivery of packaged regular and pureed lunch meals to special education classrooms. Thirty seconds per meal was the average time required to transport these lunches to the classrooms.

School Meal Food Costs

School meal food costs were calculated using cost information provided by the districts. Three cost averages were calculated: regular meals, pureed meals including all other consistency modifications, and all other special meals. Food costs were compared at each school by calculating the difference between the food cost of regular meals and the food cost of each of two types of special meals. The food cost comparison expressed as a percentage also was calculated (refer to page 9 in the method for specific formulas).

Cost of Pureed Meals

Figure 7 depicts the cost of pureed breakfast and lunch meals compared to the cost of regular meals for each school in the study. The difference in food cost for pureed breakfast meals compared to regular breakfast meals ranged from \$.05 less for School 2 in District B and School 1 in District H to \$.05 more in School 2, District C. In two schools (District E, School 1 and District G, School 1) there was no difference in the cost of pureed and regular breakfasts. The less expensive breakfasts were attributed to the use of cooked cereal and canned USDA commodity fruit in place of convenience breakfast items such as sausage biscuits and fresh fruit. The more expensive breakfasts in District C occurred because two muffins were used for pureed breakfasts while one muffin was the standard portion on the regular menu.



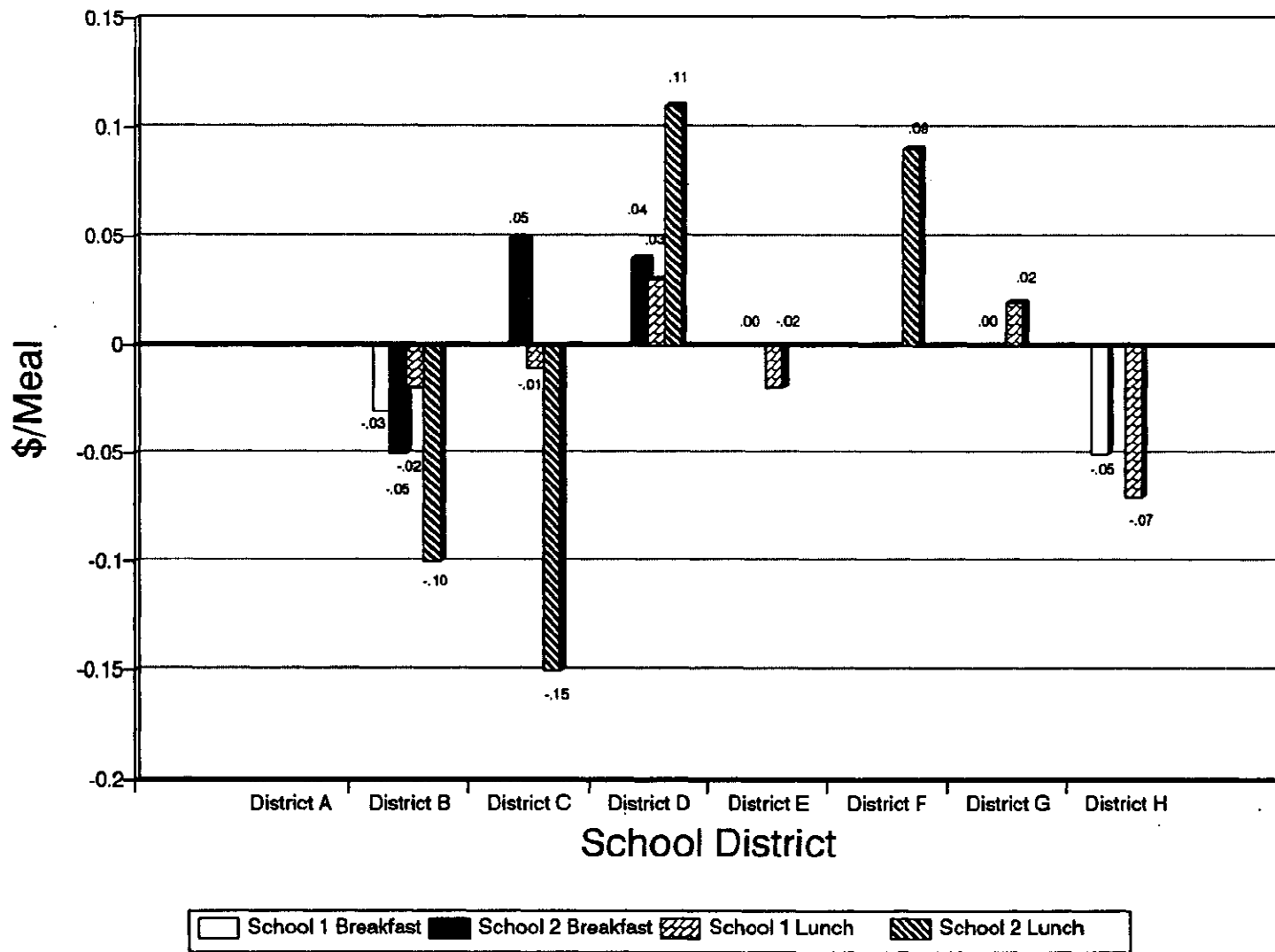


Figure 7. Food costs per meal for pureed breakfast and lunch meals compared with regular breakfast and lunch meals
 Formula: Food cost comparison (\$/meal) = average cost pureed meals - average cost regular meals

District C, School 2 showed the largest difference with pureed lunch meals costing \$.15 less than the mean cost of regular lunch meals. This school had a regular menu that offered choices, and the regular meal cost was calculated by averaging the cost of all food choices available. The school nutrition manager chose items from the regular menu to puree, and this selection was lower in cost in many instances.

School 2 in District D had an average pureed lunch cost that was \$.11 more than the cost of regular meals. The greater cost for pureed lunches in this school was attributed to using an extra carton of milk to puree food and the use of canned convenience products, such as ravioli, purchased from a grocery store. Explanations for the other variations in pureed meal food costs compared to the costs of regular meals can be found in the discussions of each district (Appendix F).

Figure 8 shows data from all schools on the food cost comparison expressed as a percentage. The percent differences are relatively high, given such small differences in cost, because the total costs for both regular and pureed meals were low. The percent difference in the cost of pureed breakfasts compared to regular breakfasts ranged from 16% less to 13% more. The percent difference in the cost of lunch meals compared to regular lunch meals ranged from 19% less in District C to 22% more in District D.

As can be seen in Figures 7 and 8 on pureed meal food cost comparisons, the high and low values seem to offset one another yielding a net effect of little to no difference in food cost. The fact that there was little difference in the cost of pureed and regular meals is substantiated when costs are compared across all schools in the study. Table 7 lists the range, means and standard deviations, and median values of food cost comparisons for all schools. There was no median difference in cost between pureed and regular breakfasts, and the pureed lunches were only \$.01 less than the cost of regular lunches. When the difference in cost was expressed as a percentage, a pureed lunch was 2% less than a regular lunch.

This finding is not surprising because the standard method to prepare pureed meals is to alter the consistency of the regular meal. Any differences in cost occurred when substitutions to the regular meal were made either because the food product did not puree well or the product needed substitution because of other food or nutrition requirements.

Cost of other special meals

Figure 9 depicts the cost of other special breakfast and lunch meals compared to the cost of regular meals for each school in the study. Other special meals are those modified in food and/or nutrient composition such as tube feedings, diabetic, low sodium, low protein, and food allergy meals. School 2 in District H had a food cost for other special breakfasts that was \$.15 less than the cost of regular breakfasts. This school prepared only one meal for a child on a low sodium/low potassium diet. The



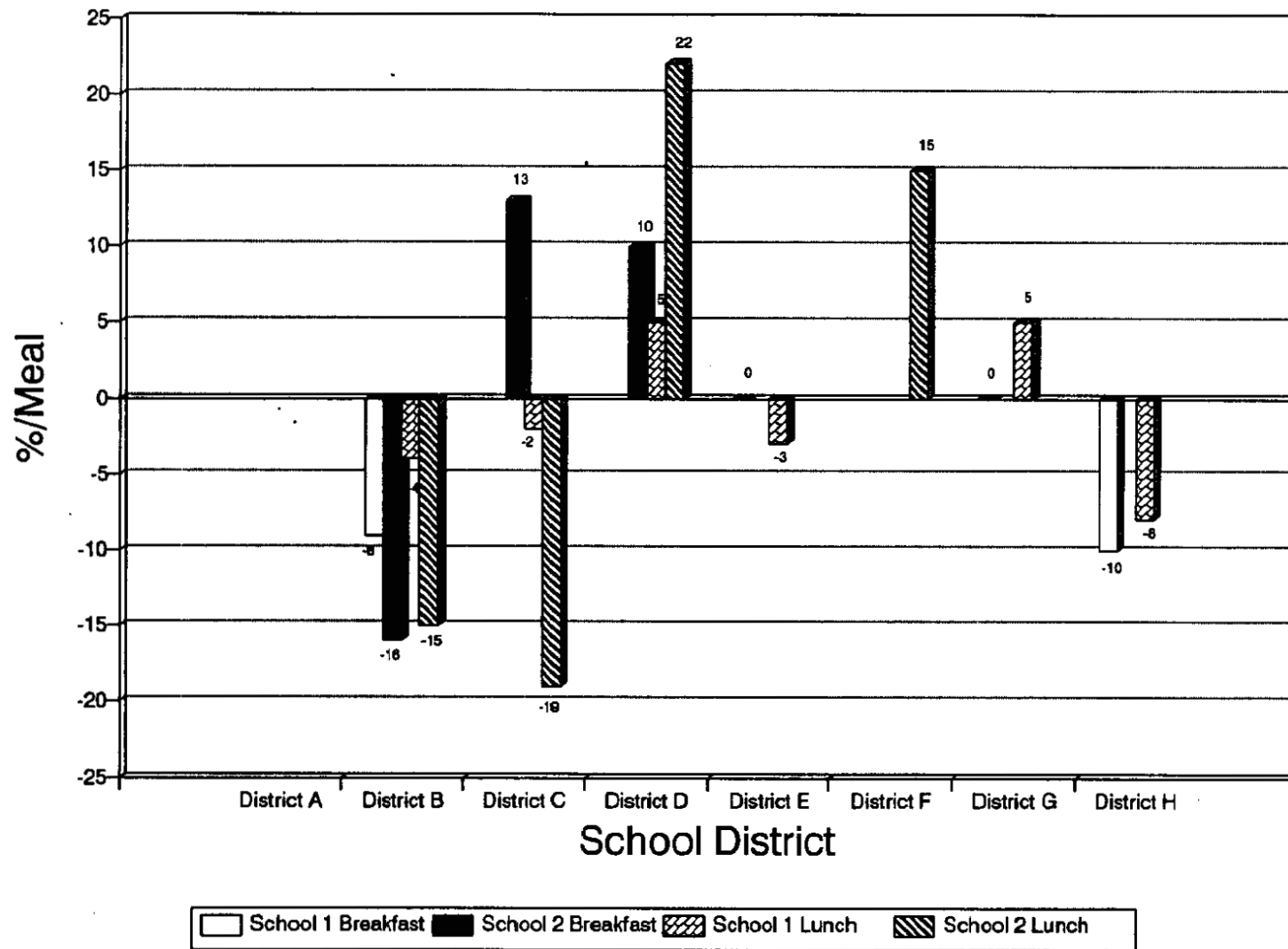


Figure 8. Food costs per meal for pureed breakfast and lunch meals compared with regular breakfast and lunch meals
 Food cost comparison (%/meal) = ((average cost pureed meals - average cost regular meals)/average cost regular meals) X 100

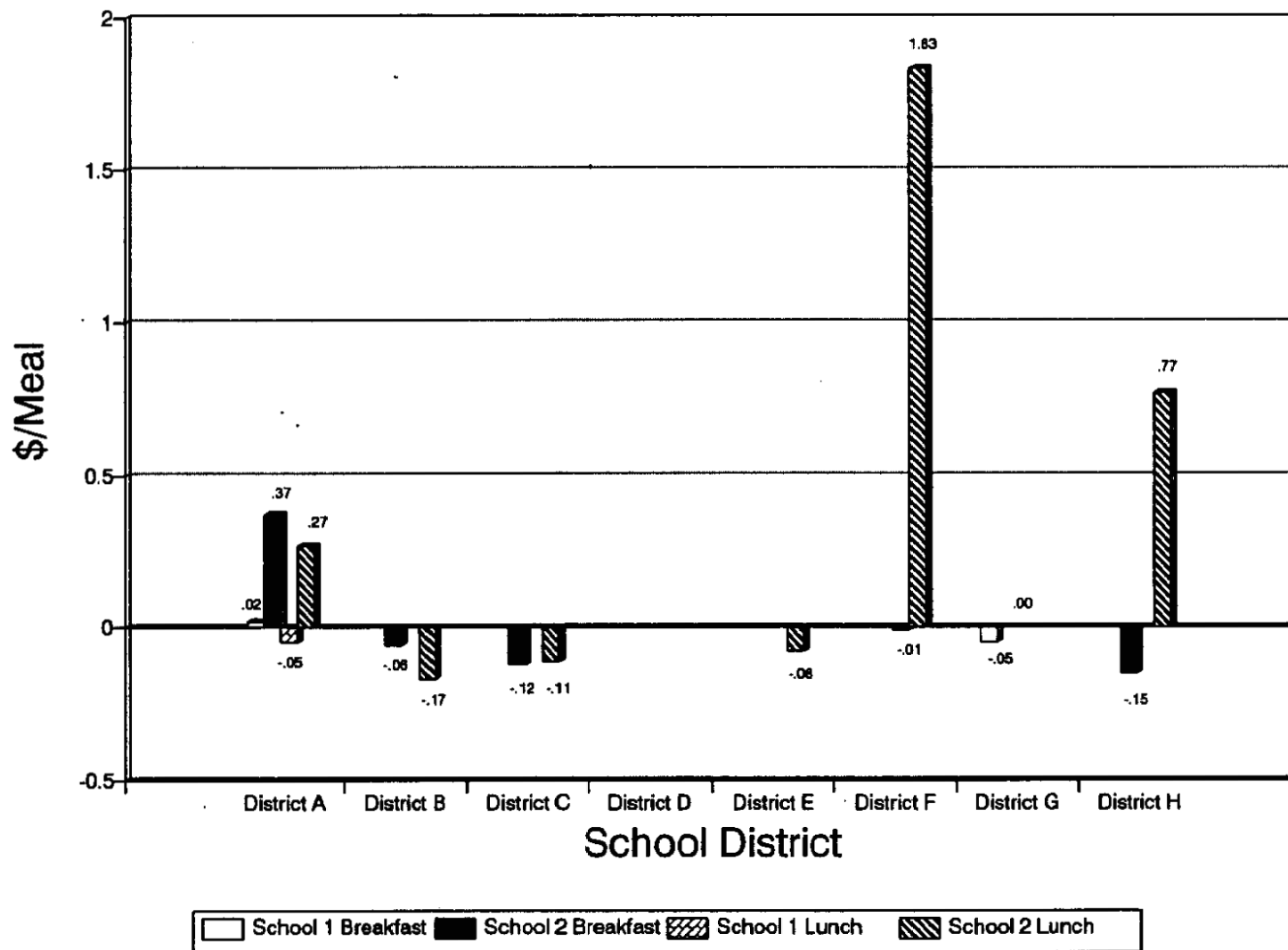


Figure 9. Food costs per meal for other special breakfast and lunch meals compared with regular breakfast and lunch meals
Food cost comparison (\$/meal) = average cost other special meals - average cost regular meals

Table 7. Comparison of food costs for special meals and regular meals (N=15 schools)

Food Cost	Range		Mean	S.D.	Median
	Min	Max			
Cost Comparison (\$/meal)^a					
Pureed meals:^b					
Breakfast	-.05	.05	-.01	.04	.00
Lunch	-.15	.11	-.01	.08	-.01
Other special meals:^c					
Breakfast	-.15	.37	.00	.19	-.05
Lunch	-.17	1.83	.27	.65	-.01
Cost Comparison (%/meal)^d					
Pureed meals:					
Breakfast	-16	13	- 2	11	0
Lunch	-19	22	0	12	- 2
Other special meals:					
Breakfast	-30	98	3	48	-13
Lunch	-24	290	52	112	- 2

^a The following formula was used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

^b Pureed meals included all special meals modified in consistency; e.g., ground and pureed meals

^c Other meals included all special meals modified in food and nutrient composition; e.g., tube feedings, diabetic, low sodium, and food allergy meals.

^d The formula was:

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100



lower breakfast costs were associated with substituting oatmeal, eggs, and toast for convenience breakfast products such as sausage biscuits and blueberry muffins. School 2 in District A, on the other hand, showed a food cost for special breakfasts that was \$.37 more than the cost of regular breakfasts. The child who received the special breakfast in this school had galactosemia, and a milk substitute was provided for breakfast instead of regular milk.

District B, School 2 had an average food cost for other special lunches that was \$.17 less than the cost of regular lunches. This difference was primarily associated with deleting dessert from the menu and substituting plain meat, made from USDA commodity turkey, for breaded meat items. School 2 in District F had the highest other special food cost for lunch when compared to regular lunches. The cost of special lunches, consisting of canned nutritional supplements, was \$1.83 greater than the cost of regular lunches. The second highest difference in special lunch costs versus regular lunch costs was in School 2, District H. The special lunches for a child who required a low sodium/low potassium meal were \$.77 more costly than regular lunches. The manager was purchasing special low sodium products from the grocery store and, in one instance, she purchased boneless chicken breasts for the luncheon entree. Explanations for additional variations in other special meal food costs compared to the costs of regular meals can be found in the discussions of each district (Appendix F).

Figure 10 illustrates data from all schools on the food cost comparison for other special meals expressed as a percentage. The percent differences are relatively high, given such small differences in cost, because the total costs for both regular and other special meals were low. The percent difference in the cost of other special breakfasts compared to regular breakfasts ranged from 30% less to 98% more. The percent difference in the cost of other special lunch meals compared to regular lunch meals ranged from 24% less in District B to 290% more in District F.

As can be seen in both figures, the cost of other special meals was equal to or less expensive than the cost of regular meals with some substantial exceptions. When school nutrition programs furnished canned nutritional supplements, the cost per meal escalated almost 300% at lunch. When items needed to be purchased from the grocery store due to quantity and uniqueness of the product, food costs increased substantially.

The fact that there was little difference in the median or mean cost of other special meals and regular meals, yet wide variability, is substantiated when costs are compared across all schools in the study. As noted in Table 7, there was no mean difference in the cost of other special breakfasts compared to regular breakfasts, but the standard deviation was \$.19 and the median was \$.05 less than the cost of regular breakfasts indicating wide variability in the data.

The same held true for other special lunches. The mean cost of these meals compared to regular meals was \$.27 more and the standard deviation was \$.65. The median value was \$.01 less than the cost of regular meals, once again indicating wide variability. The same trend appears when the cost comparisons are expressed as percentages (Table 7). The items of interest in the food cost of other special meals seem to be with the exceptions rather than the rule. In general, there was little



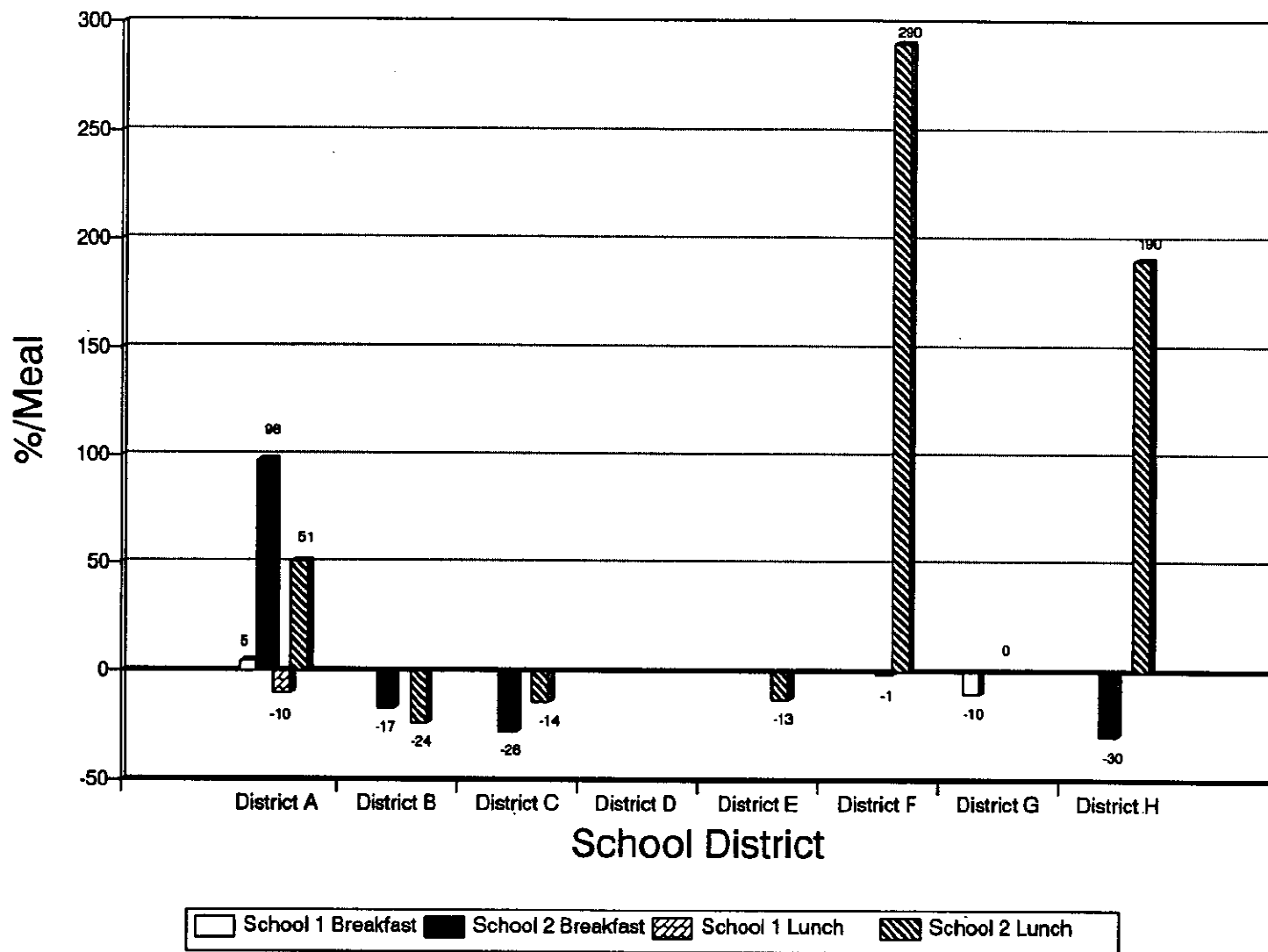


Figure 10. Food costs per meal for other special breakfast and lunch meals compared with regular breakfast and lunch meals
 Food cost comparison (%/meal) = ((average cost other special meals - average cost regular meals)/average cost regular meals) X 100

difference in cost, but if special food products such as nutritional supplements were purchased the impact on cost was dramatic.

Two caveats should be noted in relation to assumptions used in determining the meal food cost information. First, the assumption was made that modified meals were altered in food and/or nutrient content to be in compliance with medical prescriptions; otherwise, USDA meal patterns were followed, portions were maintained, and adequate calories were provided. A comparison of food costs would only be appropriate if the nutritional quality of modified meals, as noted in this assumption, were equivalent to regular meals.

Second, meal food costs were diminished by the assumption that USDA commodity foods had no associated cost. This assumption was based on the fact that districts were not consistent in allocating shipping/storage costs to USDA commodities. If USDA commodities were used uniformly for regular and modified meals, the impact on the food cost comparison would be negligible. If, however, USDA commodities were used differentially in preparing regular and modified meals, the cost comparison would be under or overstated.

CONCLUSIONS

This study was initiated to determine the costs associated with providing school meals for children with special food and nutrition needs. Findings indicate that there were additional food and labor costs associated with the provision of special meals, but most of the costs, at both the district and school levels, were associated with indirect labor. The indirect labor associated with administering the special meals program varied from 81 to 3297 minutes per month in the district and 52 to 2269 minutes per month of managers' time in the schools. If the indirect time from both the district and schools were combined to calculate total indirect costs, the range is a little over 2 hours per month (133 minutes) as the minimum and 93 hours (5566 minutes) per month, or almost 2 1/2 weeks of labor, as the maximum. Issues related to administration, therefore, are fundamental to the efficiency of providing meals to children with special food and nutrition needs.

Findings indicate that direct labor costs would be an issue only if a large number of special meals were produced. For example, results showed that it took a median of 4 labor minutes per meal to puree breakfast meals. Given that rate, it would take 15 pureed breakfasts to necessitate one extra hour of employee time devoted to preparing this type of special meal.

Direct food costs for special meals were generally equal to or less expensive than food costs for regular meals and, therefore, were not of great concern. A notable exception was found when school nutrition programs provided canned nutritional supplements or special food products, but this, too, is related to administrative decisions on funding sources for these special food products.

A basic conclusion from this research is that the provision of special meals does not need to be a costly undertaking. Some districts did incur exceptional costs, however, and the following



recommendations concentrate on improving administrative processes so labor and food costs can be minimized.

RECOMMENDATIONS

Recommendations for district school nutrition directors/supervisors from this study focus on administrative processes. Figure 1 has been revised (Figure 11) to illustrate changes that can be made to minimize costs. The five issues depicted in Figure 1 are still present, however, the time involved in resolving these issues can be reduced by prior planning and policy formulation, and thus labor time can be minimized. This is shown in Figure 11 by the bold downward lines indicating that the flow of decision making should proceed directly to provide special meals for the children. The following recommendations focus on administrative processes that can minimize costs, particularly indirect labor costs and food costs:

- ◆ Recognize that children with special food and nutrition needs exist in all school districts and develop plans to produce these meals with a minimum use of resources.
- ◆ Notify parents, teachers, and health care professionals that school nutrition programs can provide meals for children with special food and nutrition needs. A letter can be sent to parents, school nurses, principals, pediatricians, and family practitioners in the community detailing the procedures to follow in requesting a special meal. Forms on which the diet order is written also can be included in this letter. By alerting the community to this service, parents and physicians will be informed as to the necessity of written authorization for the meals and they will provide the appropriate documentation at the time of the request. This, in turn, will reduce the amount of time spent in tracking written diet orders.
- ◆ Implement the American School Food Service Association's Nutrition Integrity Standards. These standards include increasing the variety of foods, implementing choice on the menu, incorporating the Dietary Guidelines for Americans (DGA) in menu and recipe development, and offering more unprocessed food items on the menu (Gregoire & Sneed, 1993; Sneed & Gregoire, 1994). These changes will enable school nutrition personnel to modify meals for most children with special food and nutrition needs within the menus served to all children. One district school nutrition director stated that problems with special meals have been greatly reduced by implementing the DGA and offering choices on the menu.
- ◆ Establish a system for services of a registered dietitian or other qualified nutrition professional in the district. This RD may be employed full-time in school nutrition programs, or the district may contract for these services. Consulting dietitians will contract with districts on a fee-for-service basis, or the district may decide to contract with a dietetics department in a community hospital to furnish similar services. Hospital dietetics departments are looking for revenue-generating projects, and the school district would benefit from this arrangement by tapping the knowledge and talent of several dietitians who may specialize in certain types



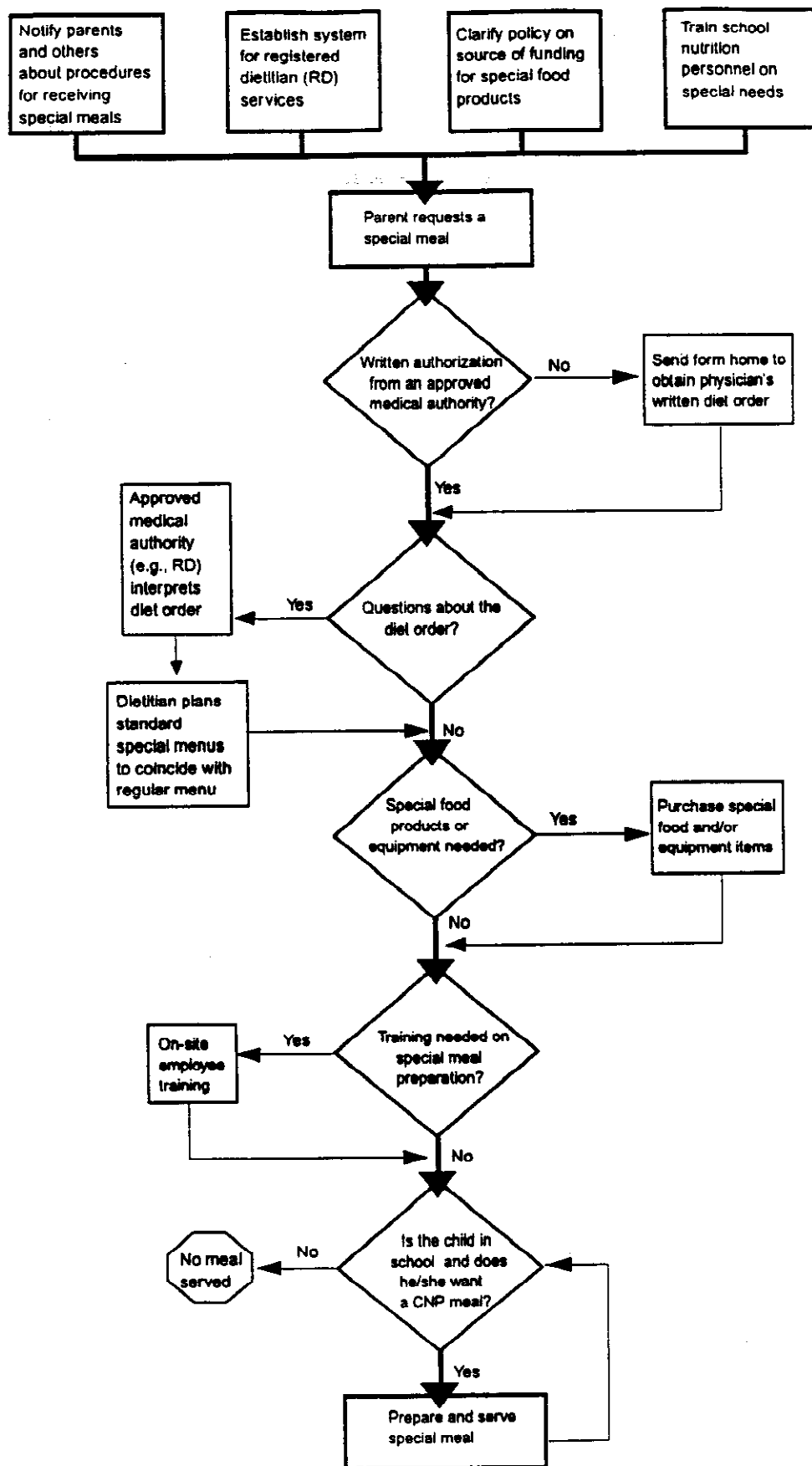


Figure 11. Flowchat representing recommended school nutrition programs processes involved in providing meals for children with special food and nutrition needs.



of medical conditions; e.g. renal disease or diabetes. Some State Departments of Education have developed access to expert nutrition advice by contracting with dietetics departments in large, urban medical centers to supply information to school nutrition programs in the state on special diets that are not commonly found in small community hospitals.

The key point is that district school nutrition directors/supervisors should plan ahead and establish a system for expert nutrition advice before there is an urgent need to interpret diet orders. Dietitian services potentially increase labor costs on a short-term basis, but decision making on special meals will be centralized in a person who has expertise in this area and, therefore, outcomes will likely decrease costs over time. Dietitians can help plan menu modifications utilizing food products already purchased by the school system. For example, frozen vegetables can be used on low sodium diets instead of purchasing low sodium, canned vegetables. If an arrangement is established ahead of time, school nutrition programs will not have to depend on dietitians in the community who may or may not have the time to give advice regarding a special meal. This alone will generate labor-savings for the district school nutrition directors/supervisors who generally take the responsibility to track down this information. Directors and/or supervisors are the most expensive sources of labor in school nutrition programs.

A dietitian can train employees, plan menus, and consult with parents and physicians if necessary. One district visited during this study was using dietitians in the district office to plan 30 days of special menus based on regular menus. When a child with a specific condition (e.g. diabetes) needed a special meal, the manager simply looked for a special meal that was close to the regular meal served that day and used this menu. By using preplanned menus, much of the manager's time in making decisions on adapting the day's menu will be eliminated. The child receives a meal specifically planned for his/her condition, and the manager is relieved from making decisions for which she may not be qualified.

- ◆ Clarify the school district's policy on purchasing nutritional supplements, other special foods, blenders, and special eating utensils. It is possible that the cost of these products can be absorbed by special education if nutritional goals are part of the Individualized Education Plan. Medicaid might be another source of funds for these products. If these items are purchased by school nutrition programs, the cost of a lunch composed of a canned supplement could be close to 300% more than the cost of regular lunch, with the cost differential for breakfast being even higher.
- ◆ Continuously train all school nutrition personnel on types of special diets and menu and recipe modifications that must be made to meet the needs of children requiring special meals. A registered dietitian employed by the district as a consultant or full-time employee can provide this training to district school nutrition directors/supervisors, school nutrition managers, and food service employees responsible for preparing and serving special meals.



- ◆ Calculate the costs associated with the provision of special meals in order to obtain objective information for decision making. Worksheets illustrating how costs can be determined are provided in Appendix G.

ADDITIONAL RESEARCH

Additional research is needed to test whether the findings of this case study can be generalized to other school districts in the nation. Future research efforts also should include nutritional analyses of regular and modified meals.



REFERENCES

- Blyler, E.M., & Lucas, B.L. (1987). Position of The American Dietetic Association: Nutrition in comprehensive program planning for persons with developmental disabilities. *Journal of The American Dietetic Association*, 87, 1068-1069.
- Gandy, L.T., Yadrick, M.K., Boudreaux, L.J., & Smith, E.R. (1991). Serving children with special health care needs: Nutrition services and employee training needs in the school lunch program. *Journal of The American Dietetic Association*, 91, 1585-1586.
- Gould, R.A., Shanklin, C.W., & Gorman, M.A. (1987). Current practices in the southwest region in providing for children with special needs within school lunch programs. *School Food Service Research Review*, 11, 94-99.
- Gregoire, M.B., & Sneed, J. (1993). *Report on nutrition integrity standards*. University, MS: National Food Service Management Institute.
- Gregoire, M.B., & Sneed, J. (1994). Competencies for district school nutrition directors/supervisors. *School Food Service Research Review*, accepted for publication in Fall issue.
- Horsley, J.W. (1988). Nutrition services for children with special needs within the public school system. *Topics in Clinical Nutrition*, 3(3), 55-60.
- Reeder, R.P., Hinshaw, M.A., & Dixon-Doss, D. (1994). Making a difference with special needs students. *School Food Service Journal*, 48(3), 66-68.
- Robinson, A. (1993). *Survey of Child Nutrition Programs in Alabama schools*. Birmingham, AL: Lumina Training Associates.
- Shugart, G., & Molt, M. (1993). *Food for fifty* (9th ed). New York: Macmillan Publishing Company.
- Sneed, J., & Gregoire, M.B. (1994). Setting the standard. *School Food Service Journal*, 48(1), 27-30.
- Sneed, J., & White, K.T. (1993). Development and validation of competency statements for managers in school food service. *School Food Service Research Review*, 17, 50-61.
- United States Department of Agriculture. (1990). *Food buying guide for Child Nutrition Programs* (Program Aid Number 1331). Washington, DC: Superintendent of Documents.



Yadrick, K., & Sneed, J. (1993). *Providing for the special food and nutrition needs of children*.
University, MS: National Food Service Management Institute.



APPENDICES



Appendix A

District School Nutrition Director/Supervisor Structured Interview Form



Start Time ____:____

**COSTS ASSOCIATED WITH PREPARING AND SERVING MEALS
FOR CHILDREN WITH SPECIAL NEEDS****DISTRICT DIRECTOR INTERVIEW**

Name _____ Date _____

District _____ Name of School #1 _____

Name of School #2 _____

Q-1 Enrollment in district _____ Q-2 No. schools _____

Q-3 What is the % of **lunch** meals served per day in the district to children in the following categories?

Free _____ Reduced _____ Paid _____

Q-4 What is the % of **breakfast** meals served per day in the district to children in the following categories?

Free _____ Reduced _____ Paid _____

Q-5 Does this district have a school(s) for children with developmental disabilities?

NO _____ YES _____ If yes, what is the enrollment? _____

Q-6 If no, or if some disabled children go elsewhere, how are the needs of these children handled?
(Check all that apply)

_____ Children with disabilities attend special classes in a regular school

_____ Children with disabilities are mainstreamed into regular classrooms



- Q-7 Estimate the **total** number of children for whom diet modifications are made served by child nutrition services in your **district**.

Breakfast _____

Lunch _____

- Q-8 Estimate the number of children for whom the following diet modifications are made in your district. Across from the diet modification, please list the medical condition for which the diet was prescribed.

DIET	# OF CHILDREN	MEDICAL CONDITION(S)
Chopped, regular	_____	_____
Ground, regular	_____	_____
Pureed, regular	_____	_____
Tube feedings	_____	_____
Diabetic	_____	_____
Low calorie	_____	_____
High calorie	_____	_____
Low fat/low cholesterol	_____	_____
Low sodium	_____	_____
Low protein	_____	_____
Milk allergies	_____	_____
Other food allergies	_____	_____
Between meal snacks	_____	_____
Other _____	_____	_____

- Q-9 Do you have written policies and procedures for handling special diets?



Q-10 Who is responsible for making menu modifications to meet the special dietary needs of children in your district?

Q-11 Who is responsible for assuring that special diets and menu modifications are produced correctly in your district?

Q-12 Who is responsible for providing assistance in feeding children in your district?

Q-13 Who is responsible for observing consumption of special diets in your district? How is this information used?

Q-14 Are registered dietitians employed full-time in your district? If so, how many people and where do they work?

Q-15 Has a RD/nutritionist been hired by the district to counsel students and their families and to plan special menus?

NO _____ YES _____

What were his/her credentials?

Q-16 If yes, for how many hours was she/he hired per month _____? year _____?

These services were provided for how many students? _____



Q-17 Have dietitians/nutritionists ever **donated** consulting time to the district to help students with special dietary needs?

NO _____ YES _____

These services were provided for how many students? _____

Q-18 The *gratis* services of a dietitian/nutritionist were obtained from:

_____ COUNTY HEALTH DEPARTMENT

_____ PRIVATE PRACTICE

_____ STATE HEALTH DEPARTMENT

_____ LOCAL HOSPITAL

_____ TITLE V PROGRAM

_____ COLLEGE/UNIVERSITY

_____ STATE DEPT OF ED

_____ OTHER: _____

Q-19 Please explain the specific types of services provided to the school district by registered dietitians/nutritionists for serving meals to children with special needs? (e.g. I.E.P., counseling, planning menus, etc.)



Q-20 Please estimate the amount of time (rounded to increments of 5 minutes) EACH MONTH that you spend in the following activities related to providing meals to children with special needs.

ACTIVITY	DIRECTOR	OTHERS	(Specify) TITLE
Acquiring the physician's written diet order and communicating with/physician	_____	_____	
Communicating with family, principals, teachers, managers, and food service staff and documenting all steps to provide specials meals	_____	_____	
Meeting with special ed teachers to develop IEP	_____	_____	
Working with RDs to plan special meals, planning meals, or working with parents to choose meals for their children	_____	_____	
Getting bids on or purchasing special food or equipment items	_____	_____	
Coordinating or conducting training of food service staff	_____	_____	
Other: _____	_____	_____	

Q-21 What is the approximate hourly salary of the district staff that devote time to providing meals for children with special needs?

\$ _____ Food service workers \$ _____ Manager

\$ _____ Clerical staff



Q-22 What is the highest level of education attained by each manager?

School #1 _____

School #2 _____

Q-23 What is the certification status of each manager?

School #1 _____

A. Not certified

B. State Dept. of Ed. certified

School #2 _____

C. ASFSA certified

D. Registered dietitian

Q-24 Are you making any special food purchases at the district level (such as canned pureed meat, Pediasure, sugar-free products, low sodium products, etc) to meet the needs of children on special diets?

_____ NO _____ YES

If yes, what foods are being purchased, how much does it cost and how much is used per month?

ITEM	UNIT	PRICE	AMOUNT USED/MO



Q-25 Have you made any special equipment purchases at the district level (such as blenders, special eating devices, etc.) to meet the needs of children on special diets?

_____ NO _____ YES

If yes, what equipment has been purchased, where is it used, and how much did it cost?

ITEM	USE	QTY	UNIT	PRICE

Q-26 Have any modifications been made to the serving line or dining room to accommodate children with special needs? (eg, wider aisles, lower traylines, removing stools from tables).

_____ NO _____ YES What changes? _____

What costs were incurred? _____

Q-27 What is the average daily food cost for a regular breakfast? _____

regular lunch? _____

Q-28 What is the average daily food cost for a special meals?

_____ Breakfast _____ Lunch

Q-29 Have funds from sources other than food service been used to pay expenses associated with preparing and serving meals for children with special needs?

_____ NO _____ YES If yes, source of funds?

What was purchased, and what is the average contribution per meal?



Q-30 Can you supply a copy of the district food bids in order to determine food costs?

Q-31 What are the total labor hours per day (excluding manager) in the schools where time will be recorded? What is the labor cost?

SCHOOL	LABOR HOURS/DAY	LABOR COST
#1 _____	_____	_____
#2 _____	_____	_____

Stop Time ____:____



Appendix B

School Nutrition Manager Structured Interview Form



**COSTS ASSOCIATED WITH PREPARING AND SERVING MEALS
FOR CHILDREN WITH SPECIAL NEEDS****SCHOOL MANAGER INTERVIEW**

Name _____ Date _____

District/School _____

Q-1 School Enrollment _____

Q-2 Grades at this school _____

Q-3 What is the average # of lunch meals served per day to children?

Free _____ Reduced _____ Paid _____

Q-4 What is the average # of breakfast meals served per day to children?

Free _____ Reduced _____ Paid _____

Q-5 Estimate the **total** number of children for whom diet modifications are made by child nutrition services in your school.

Breakfast _____ Lunch _____

Q-6 Estimate the number of children for whom the following diet modifications are made in your school. Across from the diet modification, please list the medical condition for which the diet was prescribed.

DIET	# OF CHILDREN	MEDICAL CONDITION(S)
Chopped, regular	_____	_____
Ground, regular	_____	_____
Pureed, regular	_____	_____
Tube feedings	_____	_____
Diabetic	_____	_____



DIET	# OF CHILDREN	MEDICAL CONDITION(S)
Low calorie	_____	_____
High calorie	_____	_____
Low fat/low cholesterol	_____	_____
Low sodium	_____	_____
Low protein	_____	_____
Milk allergies	_____	_____
Other food allergies	_____	_____
Between meal snacks	_____	_____
Other _____	_____	_____

Q-7 Who is responsible for making menu modifications to meet the special dietary needs of children in your school?

Q-8 Who is responsible for assuring that special diets and menu modifications are produced correctly in your school?



Q-9 Please estimate the amount of time (rounded to increments of 5 minutes) EACH WEEK that you spend in the following activities related to providing meals to children with special needs.

ACTIVITY	MANAGER	OTHERS	(Specify) TITLE
Acquiring the physician's written diet order and communicating with physician	_____	_____	
Communicating with family, principals, teachers, supervisor and food service staff and documenting all steps to provide special needs	_____	_____	
Meeting with special ed teachers to develop IEP	_____	_____	
Working with RDs to plan special meals, planning meals, or working with parents to choose meals for their children	_____	_____	
Securing special food or equipment items	_____	_____	
Conducting training for food service staff or participating in workshop conducted by others	_____	_____	
Providing assistance in feeding children	_____	_____	
Observing consumption of special diets	_____	_____	
Other: _____	_____	_____	



Q-10 What types of records are maintained on meals provided to children with special needs?

Q-11 Have you or any of your staff attended a workshop(s) on providing meals for special children?
(ie, special diets, food preparation for special diets)

_____ NO _____ YES

If yes, how many employees attended? _____

How long was the workshop(s)? _____

Who conducted the workshop(s)? _____

Q-12 Are you making any special food purchases at the school level (such as canned pureed meat, Pediasure, sugar-free products, low sodium products, etc) to meet the needs of children on special diets?

_____ NO _____ YES

If yes, what food items are being purchased and what is the cost?

ITEM	UNIT	PRICE



Q-13 Are you making any special equipment purchases at the school level (such as blenders, special eating devices, etc.) to meet the needs of children on special diets?

_____ NO _____ YES

If yes, what equipment has been purchased and how much did it cost?

ITEM	QTY	UNIT	PRICE

Q-14 Are parents/guardians, Special Education, or other non-CNP personnel furnishing any food supplements or special food items for children with special needs?

_____ NO _____ YES

If yes, what food items have been provided and by whom?

ITEM	UNIT	BY WHOM

Q-15 Have parents/guardians, Special Education or other non-CNP personnel purchased blenders or any other equipment used by your staff to prepare meals for children with special needs?

_____ NO _____ YES

If yes, what equipment has been purchased and by whom?

ITEM	UNIT	BY WHOM





Appendix C

Labor Cost Recording Form



LABOR COST RECORDING FORM

School District/School _____ Day _____ Date _____

Employee Name	Meal B or L	Type of Diet	# Meals Prepared	Start Time Hr:Min	Stop Time Hr:Min	Special Foods Used
		Pureed				

Employee Name	Meal B or L	Type of Diet	# Meals Prepared	Start Time Hr:Min	Stop Time Hr:Min	Special Foods Used
		Other: _____ _____ _____	_____ _____ _____			

Employee Name	Meal B or L	Type of Diet	# Meals Prepared	Start Time Hr:Min	Stop Time Hr:Min	Special Foods Used
		Pureed				

Employee Name	Meal B or L	Type of Diet	# Meals Prepared	Start Time Hr:Min	Stop Time Hr:Min	Special Foods Used
		Other: _____ _____ _____	_____ _____ _____			





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Appendix D

Menu Cost Recording Form



MENU RECORDING FORM

School District/School _____ Completed by _____

Day _____ Date _____ Total Number of Meals Served: Breakfast _____ Lunch _____

BREAKFAST MENU

Type: REGULAR	# Meals _____	\$	Type: PUREED	# Meals _____	\$
			Liquid to Blenderize: Milk _____ Formula _____		
Total Cost			Total Cost		
Type: _____	# Meals _____	\$	Type: _____	# Meals _____	\$
Total Cost			Total Cost		
Type: _____	# Meals _____	\$	Type: _____	# Meals _____	\$
Total Cost			Total Cost		



MENU RECORDING FORM

School District/School _____ Completed by _____

Day _____ Date _____ Total Number of Meals Served: Breakfast _____ Lunch _____

LUNCH MENU

Type: REGULAR # Meals _____	\$	Type: PUREED # Meals _____	\$
		Liquid to Blenderize: ____Milk _____Formula	
Total Cost		Total Cost	
Type: _____ # Meals _____	\$	Type: _____ # Meals _____	\$
Total Cost		Total Cost	
Type: _____ # Meals _____	\$	Type: _____ # Meals _____	\$
Total Cost		Total Cost	



Appendix E

Recipe Costing and Menu Item Costing Forms





RECIPE COSTING FORM

School District/School _____

Recipe _____

Portion Size _____

Yield _____

Cost per serving _____

Ingredients	Weight	Measure	Bid Price	Purchase Unit	Total Cost



MENU ITEM COSTING FORM

School District/School _____

Data Collection Dates _____

Menu Item	Type	Bid Price	Purchase Unit	Portion Size	Portion Cost

Appendix F

Special Needs Procedures and Cost Information Districts A through H



DISTRICT A

Demographic Information for District

District A consists of six schools and has a student enrollment of about 2,375. Approximately 96% of the children who eat school lunch receive a free or reduced price meal. The district does not operate a special school for severely developmentally disabled children. Disabled children attend special classes in schools or are included in traditional classes.

Special Food and Nutrition Services

The district school nutrition director estimated the number of children for whom specific menu modifications were being provided in this current school year 1993-1994 (Table A-1). The director indicated that approximately eight children in the school district required some type of menu modifications. Three children in the district required meals that were altered due to food allergies. One child is allergic to eggs, and two children are allergic to fish, corn, tomatoes, and strawberries. At present, there were no children who required consistency modifications such as pureed or ground food.

The district school nutrition director indicated that guidelines on meal service for children with special needs and medical statement forms provided by the State Department of Education were being utilized in the district. The director reported that neither she nor any of her staff are registered dietitians. When asked who was responsible for making menu modifications to meet the special dietary needs of children in District A, the director indicated that initially when the district began providing special meals, she was responsible for the menu modifications. At the present time, each manager works with parents to make the menu modifications and the director reviews the menus. The district school nutrition director indicated that this allows the manager to develop a rapport with parents of the children who receive special meals.

The district school nutrition director reported that each manager was responsible for the assurance of accurate production of special diets and menu modifications. The district utilizes a computerized meal count package that flags special diets and allows a second check of the special meal by the cashier. This special diet feature is part of the computer software package and did not require an additional expense. When a child requiring a special diet tells the cashier his/her number, a message appears on the computer screen that says, "This child requires a special diet." The cashier must know what type of special meal the child needs and then can monitor the tray to determine that the child has received food in compliance with the diet. If children require assistance with feeding, teachers and aides provide this service in each school. At the present time, there are no students in District A who require assistance with feeding. The teachers are responsible for the observation of consumption of special diets in the district.



Table A-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modifications:			
Ground, regular	0	0	0
Pureed, regular	0	0	0
Other special modifications:			
Tube feedings	0	0	0
Diabetic	1	0	1
Low calorie	1	1	0
High calorie	0	0	0
Low fat/low cholesterol	1	0	1
Low sodium	0	0	0
Low protein	0	0	0
Milk allergies	2	0	1
Other food allergies	3	3	0
Between meal snacks	0	0	0
Other	0	0	0
Total	8	4	3

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. The district school nutrition director stated that she sends a cover letter with the State Department of Education guidelines and medical statement forms to building principals at the beginning of each school year. The principals forward these letters to the district nurse who sends a copy to parents whose children require special diets. Every month the district school nutrition program sends each parent a menu to be altered according to the special food and nutrition needs of the child. The parent sends the altered menu back to the school nutrition manager at the child's school. The director and manager review the menus for compliance with the physician's diet order and USDA meal pattern requirements. Copies of the written diet order are kept on file in each school nutrition manager's office and in the office of the district director.



Training

The district school nutrition director indicated that no formal group training sessions had been conducted for district employees on the preparation of meals for children with special food and nutrition needs. The majority of training is done on a case by case basis. The district director trains each school nutrition manager on food items to be purchased, food items to avoid, and preparation methods for special diets. The director also stresses to managers the importance of reading food labels and ingredient information. Previously, the district director and special education teacher worked closely together to provide blenderized meals for several students. They experimented with the consistency and combinations of foods. The two school nutrition managers responded that neither they nor their staff had attended any workshops on providing meals for children with special food and nutrition requirements.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that district office personnel spend in activities related to providing meals to children with special needs, and results are summarized in Table A-2. The district director spent over 12 hours (762 minutes) each month on these activities. The majority of her time was spent in activities related to communicating with students, families, principals, teachers, managers, and food service staff. Additional time was expended in activities related to acquiring the physician's written diet order and purchasing special food items. An estimated 47 minutes per month of clerical time were spent on acquiring the physician's diet orders which included mailing diet order forms and maintaining a filing system. An additional 45 minutes per month of clerical time was expended in activities related to planning meals, which included mailing menus to parents each month. The total time per month spent by district office personnel in activities related to providing meals to children with special needs was over 14 hours (854 minutes).

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians or nutritionists to counsel students or to plan special menus. Last year, a dietitian from a local hospital donated consulting time for one diabetic child. She assisted the district school nutrition director by reviewing school menus and suggesting changes to meet the child's prescribed meal pattern.

District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases have been made this school year to accommodate the diets of children with special needs. Food purchases averaged \$56 per month for Isomil, sugar-free gelatin, tomato juice, and V-8 juice from local discount stores and grocery stores. These products were purchased for the children who were receiving



Table A-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs

Activity	Director	Clerical	Total
< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	40	47	87
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	720	0	720
Meeting with special education teachers to develop IEP	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	45	45
Getting bids on or purchasing special food or equipment items	2	0	2
Coordinating or conducting training of food service staff	0	0	0
Other activities	0	0	0
Total	762	92	854



special meals at School 2. The director reported that the district had not purchased any supply items or equipment solely for the preparation of special meals this current school year.

The director indicated that funds other than CNP funds have been used to purchase items associated with the preparation and service of meals to children with special needs. In the past, special education funds have been used to purchase special eating utensils.

Demographic Information for Selected Schools

School 1 housed pre-kindergarten through first grade and fourth and fifth grades. The school enrolled 800 students. Approximately 741 children ate lunch daily with about 75% receiving free or reduced price meals. The school nutrition manager has a high school education and is State Department of Education certified.

School 2 housed second, third, seventh, and eighth grades and had an enrollment of 768. Approximately 625 children ate lunch daily with about 81% receiving free or reduced price meals. The manager at School 2 has a high school education plus additional business courses and is State Department of Education certified.

The school nutrition managers reported the number of children for whom specific menu modifications were being made (Table A-1). The district school nutrition director and managers indicated that special meal preparation has been simplified since food choices are available for children starting with the fourth grade. In many instances, limited special food preparation is required since food items from the choice menu can be utilized for the children in the lower grades. Four children at School 1 were receiving special meals that consisted of low calorie/low fat, fish/corn/tomatoes/strawberries allergies, and egg allergy meals. Three children at School 2 were receiving special meals: low fat/low cholesterol/no caffeine, diabetic, and galactosemia.

School Costs

School Indirect Labor Costs

Each school nutrition manager was asked to estimate the time spent in activities related to providing meals to children with special food and nutrition needs (Table A-3). Both managers indicated that the majority of their time was spent communicating with students, families, principals, teachers, director, and food service staff. The manager in School 1 reported that she spends 70 minutes each month planning meals and 7 minutes per month training employees who are preparing the special meals. The school nutrition manager in School 1 is spending approximately 4 hours (256 minutes) or about 64 minutes per child each month on activities related to providing meals to children with special food and nutrition needs. The manager at School 2 reported that she spends 15 minutes per month securing special food items and 7 minutes per month planning special meals. The school nutrition manager at School 2 is spending approximately 1 hour (52 minutes) or about 17 minutes per



Table A-3. Estimated indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
< ----- minutes/month ----- >		
Acquiring the physician's written diet order and communicating with physician	0	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	179	30
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	70	7
Securing special food or equipment items	0	15
Coordinating training for food service staff or participating in workshop conducted by others	7	0
Providing assistance in feeding children	0	0
Observing consumption of special diets	0	0
Total	256	52



child each month on activities related to providing meals to children with special food and nutrition needs.

School Direct Labor Costs

School 1 employees recorded the direct labor time to prepare the special breakfast and lunch meals. No pureed meals were prepared in this school. Limited special meal preparation is required at School 1 since food items from the choice menu can be incorporated into the special meals. Labor time for breakfast was 5 minutes for 1 special meal. Labor time for lunch averaged 4 minutes per meal (Table A-4). The direct labor time for lunch included preparation time for a special bread without eggs for the child who is allergic to eggs.

Employees at School 2 also reported the labor time required to prepare the special breakfast and lunch meals. No pureed meals were prepared in this school. Labor time for breakfast was 3 minutes for 1 special meal. Labor time for special lunch meals averaged 8 minutes per meal. Special preparation was required to reconstitute the Isomil and to prepare sugar-free gelatin and special bread products without milk. No additional labor time was required to prepare the low fat/low cholesterol/no caffeine special lunch meal. The child's parent usually marked the menu for the child to receive a chef salad and since she was in the eighth grade, this was a choice offered to all children.

Mean minutes per meal for the preparation of other special breakfast and lunch meals were calculated for the two schools (Table A-4). The mean for preparing special breakfasts for both schools in District A was 4 minutes per meal. The mean for preparing special lunch meals for both schools was 6 minutes per meal in District A.

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Two cost averages were calculated based on five days of data: regular meals and other special meals such as low calorie, diabetic, low fat, and food allergies. There were no pureed meals in the two schools in District A. Food costs were compared at each school by calculating the difference between the food cost of special meals and the food cost of regular meals. The cost comparison expressed as a percentage also was calculated. (Refer to page 9 in the method section for specific formulas.)

The average cost of a special breakfast was \$.02 and \$.37 more than a regular breakfast at School 1 and School 2, respectively (Table A-5). The cost per meal for special breakfasts was 5% more in School 1 and 98% more in School 2. The percentages were high given such a small difference in cost because the total costs for both regular and special breakfasts were low. The cost of the special breakfast expressed as an average of both schools was 51% more than the cost of the regular breakfast (Table A-5). The higher cost for special breakfast meals at School 1 was associated with the substitution of a meat product and biscuit for less expensive breakfast items



Table A-4. Labor minutes per meal for preparation of pureed meals and other special breakfast and lunch meals

	School 1	School 2	Both Schools
< ----- mean minutes/meal ^a ----- >			
Pureed meals:			
Breakfast	--- ^b	--- ^b	--- ^b
Lunch	--- ^b	--- ^b	--- ^b
Other special meals:			
Breakfast	5 ^c	3 ^d	4 ^e
Lunch	4 ^c	8 ^d	6 ^e

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Other special meals included low calorie/low fat, strawberries/tomatoes/fish/corn allergies, and egg allergy.

^d Other special meals included diabetic and galactosemia.

^e Average of data from schools 1 and 2.

such as donuts and cinnamon raisin biscuits. The cost differential in special breakfast meals at School 2 is associated with the substitution of Isomil for milk.

The average cost of other special lunch meals as compared to regular lunch meals was \$.05 less in School 1 and \$.27 more for School 2. The cost per meal for special lunches was 10% less and 51% more in Schools 1 and 2, respectively. The cost of the special lunches expressed as an average of both schools was 20% more than the cost of the regular lunch (Table A-5). For children requiring special meals, the manager at School 1 selected items from the choice menu offered to the older students. These choices were sometimes of lower cost. In addition, special bread and dessert products were prepared for a child who was allergic to eggs. In some instances these products had a lower cost than purchased products. Differences in cost at School 2 was associated with use of special products such as Isomil and sugar-free gelatin.



Table A-5. Comparison of food costs for special meals and regular meals

	School 1		School 2		Both Schools	
	Food cost comparison ^a		Food cost comparison ^a		Food cost comparison ^b	
	\$	%	\$	%	\$	%
Pureed meals:						
Breakfast	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c
Lunch	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c
Other special meals:						
Breakfast	.02 ^d	5	.37 ^e	98	.19	51
Lunch	-.05 ^d	-10	.27 ^e	51	.11	20

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b Average of data from schools 1 and 2.

^c This type of meal was not served in this school.

^d Other special food cost consisted of an average cost for low calorie/low fat, strawberries/tomatoes/fish/corn allergies, and egg allergy meals.

^e Other special food cost consisted of an average cost for diabetic and galactosemia meals.





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DISTRICT B

Demographic Information for District

District B consists of 101 schools and has a student enrollment of about 60,000. Approximately 76% of the children who eat lunch receive a free or reduced price meal. The district operates three special schools for severely developmentally disabled children. Disabled children also attend special classes in other schools. The Board of Education contracts with the boards of five other surrounding school districts to provide special classes for children with disabilities, and these children also participate in the school nutrition program.

Special Food and Nutrition Services

The district school nutrition director stated that approximately 300 students in the district received modified meals, but she was not able to give a specific accounting of the number of children for whom specific menu modifications were being provided in this current school year 1993-1994 (Table B-1). The process for assuring that children with special needs were provided with meals tailored to their requirements was decentralized, and information concerning physician's diet orders and special diet meal plans was held in the offices of the school nutrition manager and the principal at each school.

The district director indicated that guidelines on meal service for special needs children provided by the State Department of Education were being utilized in the district. Twelve registered dietitians (RDs) were employed by school nutrition programs. Four RDs, including the district director, work in the district office, and eight were school nutrition managers. Of the remaining managers, 67 had baccalaureate degrees in home economics or nutrition, and 10 managers did not have a 4-year college degree. When asked who was responsible for making the menu modifications to meet the special food and nutrition needs of children in District B, the director responded that each manager worked independently with parents and special education teachers. The director commented on her highly trained management staff, but she also noted that the policy to hire managers with baccalaureate degrees is no longer in effect due to cost containment measures in the district. She also noted that the decentralization of decision-making regarding special meals may need to be centralized in the future.

The director reported that each school nutrition manager was responsible for making menu modifications and assuring accurate production of special diets. The manager communicates with the special education teachers to ensure that the meals are pureed to the desired consistency. If children require assistance with feeding, special education aides provide this service in each school. Nursing staff at each school are responsible for observing the consumption of special meals.



Table B-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modifications:			
Ground, regular	---	5	0
Pureed, regular	----	1	27
Other special modifications:			
Tube feedings	----	0	0
Diabetic	----	0	1
Low calorie	----	0	0
High calorie	----	0	11
Low fat/low cholesterol	----	0	1
Low sodium	----	0	1
Low protein	----	0	0
Milk allergies	----	0	3
Other food allergies	----	2	2
Between meal snacks	----	0	1
Other	----	0	0
Total	----	8	47

* This information was not available in the district school nutrition office.

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. Parents are informed that a written diet order, signed by a physician licensed by the State, is required before menu modifications can be implemented. The district director and other RDs in the district office are available for consultation if problems arise. Personnel also have received advice from dietitians employed at local hospitals. The State Department of Education has contracted with a dietitian in a large urban medical center in the state to be "on call" to assist district personnel who encounter unfamiliar diets.



Training

A series of training sessions on providing meals for children with special food and nutrition needs was held in the district two years ago. The sessions were conducted by the school nutrition manager who was responsible for providing meals in one of the schools for developmentally disabled children. One manager in a school where data were collected had attended at least one of these sessions but the other manager had not attended any. No recent training on special meals had occurred.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that district office personnel spend in activities related to providing meals to children with special needs, and results are summarized in Table B-2. The director spent eight hours (480 minutes) each month on these activities. The majority of her time was spent in activities related to communicating with students, families, principals, teachers, managers, and food service staff and to purchasing special food or equipment items. Approximately 30 minutes per month of clerical time were spent in typing letters and memos concerning issues related to special needs. Total time per month spent by district office personnel in activities related to providing meals to children with special needs was almost eight and one-half hours (507 minutes).

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians or nutritionists to counsel students or to plan special menus because RDs are employed in the district. There are, therefore, no direct labor costs associated with providing meals to children with special needs.

District Food and Equipment Purchases

The District B school nutrition program maintained a policy that no special foods are to be purchased for children with special needs. Any menu modifications are made with food available through the district's central purchasing department. The district maintains strict formulas for labor in each school, and reports on food and supply costs are sent monthly to the district office from each school. This school year six blenders, at a total cost of \$1800, were purchased for schools preparing meals for children with special needs. Other equipment was purchased in the past for schools for children with developmental disabilities. A hot/cold cart system with special trays and plates was purchased several years ago. Tables designed to accommodate wheelchairs, special plates, glasses, and eating utensils were purchased in the past.



Table B-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs

Activity	Director	Clerical	Total
< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	0	0	0
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	427	27	454
Meeting with special education teachers to develop IEP	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	0	0
Getting bids on or purchasing special food or equipment items	53	0	53
Coordinating or conducting training of food service staff	0	0	0
Other activities	0	0	0
Total	480	27	507



The district school nutrition director indicated that funds other than school nutrition program funds are used to purchase items associated with the preparation and service of meals to children with special needs. Special education funds are used to purchase tube feedings and other nutritional supplements as well as bibs and feeding utensils. At one school the manager had been furnishing disposable plastic aprons and paper towels for the aides who feed the children until her supply costs became too high. She now allows the aides to wash cloth aprons and towels in the clothes washer owned by the school nutrition program. This has brought her supply costs back in line with the district norm.

Demographic Information for Selected Schools

The two schools in District B selected for data collection housed pre-kindergarten through fifth grade students. School 1 provided special education classes. School 1 had an enrollment of 312 students and an average daily lunch participation of 233 students with approximately 74% receiving free or reduced price meals. The school nutrition manager is a registered, licensed dietitian who is State Department of Education and American School Food Service Association (ASFSA) certified.

The School 2 kitchen prepared meals for the elementary school in which it was located and also served as a base kitchen for another nearby building which housed classes for children who were severely disabled. The elementary school had an enrollment of 153 and the school for the developmentally disabled had 86 children. The school nutrition program had an average daily lunch participation of 178 children with approximately 90% receiving free or reduced price meals. The manager at School 2 has a college degree, and is State Department of Education and ASFSA certified.

The school nutrition managers reported the number of children for whom specific diet modifications were being made (Table B-1). School 1 had implemented an offer versus serve system, and the two children with food allergies were able to be accommodated by helping the children make appropriate choices at the serving line. The children receiving the special meals at School 2 were mainly the children at the school for children with developmental disabilities. Approximately 55% of the children from this school received a modified meal.

School Costs

School Indirect Labor Costs

Each manager was asked to estimate the time she spent in activities related to providing meals to children with special needs (Table B-3). The manager in School 1 estimated that she spent approximately 5 minutes per day (100 minutes/month) planning special meals for the children. The manager in School 2 indicated that her time was spent on acquiring the diet order and communicating with the students, families, principals, teachers, supervisors, and food service



Table B-3. Estimated indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
< ----- minutes/month ----- >		
Acquiring the physician's written diet order and communicating with physician	0	40
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	20	53
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	100	0
Securing special food or equipment items	7	0
Coordinating training for food service staff or participating in workshop conducted by others	0	0
Providing assistance in feeding children	0	0
Observing consumption of special diets	40	0
Total	167	93



staff about special diets. The total time per month the managers spent in administering the special meals program was approximately 3 hours (167 minutes) and 1 1/2 hours (93 minutes) in Schools 1 and 2, respectively.

The amount of indirect labor per child with a special food and nutrition requirement was 21 minutes per month for School 1 and 2 minutes for School 2. The manager in School 1 is a registered dietitian who was very involved in assuring that children were fed properly. She indicated that she spent approximately 10 minutes each week observing the consumption of food, even though the overall responsibility for assuring that children in special education classes ate was assigned to special education aides or the school nurse. The time allocated to providing meals to children with special needs in School 2 may have been diminished by the fact that the manager also had responsibility for a middle school kitchen, approximately three blocks from this location. She told the research scientists that the time she spent in the elementary school was limited, and that she relied heavily on the judgment of a cook who had many years of experience preparing modified meals for individuals in nursing homes.

School Direct Labor Time Costs

School 1 employees recorded the direct labor time required to prepare the pureed breakfast and lunch meals. Labor time for pureed and ground breakfast meals averaged 1 minute per meal (Table B-4). The mean additional direct labor time to prepare pureed and ground lunches was 2 minutes. An additional minute per meal was spent in dishing pudding for the special education children receiving a regular meal. The dessert on the menu was cinnamon graham crackers, and the manager thought that the special education children would have problems eating this product. This extra minute per meal is listed in Table B-4 as time associated with other lunch meals. School 1 had no other type of special meal for which preparation was required.

Employees at School 2 reported the labor time required to prepare the special meals that were sent to the satellite school for children with developmental disabilities. Labor time for all types of special meals for breakfast was not recorded in the production area because the menu had been adapted to include items that all children at the school could eat. For example, grits or oatmeal was always served. The reported labor time associated with breakfast was the time used to transport the breakfast cart to the school and serve the children. The average transport time for breakfast was 1 minute per meal.

Luncheon items were pureed in the elementary school base kitchen. Labor time to puree meals for lunch averaged 2 minutes per meal. All regular and special meals sent to the satellite school were assembled on a trayline and transported in an enclosed, heated cart. Three employees were involved in the trayline assembly and loading of meals in the cart. The average assembly and transport time for lunch was 1 minute per meal. The labor minutes used in preparing the other types of modified luncheon meals (diabetic, low sodium, etc.) in School 2 were not recorded. Mean minutes per meal for the preparation of lunch pureed meals were calculated for the two schools (Table B-4).



Table B-4. Labor minutes per meal for preparation of pureed/ground meals, delivery of special education meals, and preparation of other special breakfast and lunch meals

	School 1	School 2	Both Schools
< ----- mean minutes/meal ^a ----- >			
Pureed/ground meals:			
Breakfast	1	---- ^b	---- ^c
Lunch	1	2	2 ^d
Special education tray delivery:			
Breakfast	---- ^b	1	---- ^c
Lunch	---- ^b	1	---- ^c
Other special meals:			
Breakfast	---- ^b	---- ^b	---- ^b
Lunch	1 ^e	---- ^b	---- ^c

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Data available from only one school; mean not calculated.

^d Average of data from schools 1 and 2.

^e Other special meals were prepared for special education children on regular meals.

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Three cost averages were calculated based on five days of data: regular meals, pureed meals, and all other special meals such as diabetic, low fat, and low sodium. Food costs were compared at each school by calculating the difference between the regular meals and each of two types of special meals. The cost comparison expressed as a percentage also was calculated. (Refer to page 9 in the method section for specific formulas.)

The average cost of pureed and ground breakfasts in School 1 was \$.03 less than a regular breakfast and \$.05 less than a regular breakfast in School 2 (Table B-5). The cost per meal for pureed breakfasts was 9% less in School 1 and 16% less in School 2. The percentages were high given such a small difference in cost because the total costs for both regular and pureed breakfasts were low. The cost of the pureed and ground breakfasts expressed as an average of both schools was 13% less



Table B-5. Comparison of food costs for special meals and regular meals

	School 1		School 2		Both Schools	
	Food cost comparison ^a		Food cost comparison ^a		Food cost comparison ^b	
	\$	%	\$	%	\$	%
Pureed/ground meals:						
Breakfast	-.03	-9	-.05	-16	-.04	-13
Lunch	-.02	-4	-.10	-15	-.06	-9
Other special meals:						
Breakfast	---- ^c	---- ^c	-.06 ^d	-17	---- ^e	---- ^e
Lunch	---- ^c	---- ^c	-.17 ^d	-24	---- ^e	---- ^e

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b Average of data from schools 1 and 2.

^c This type of meal was not served in this school.

^d Other special food costs consisted of an average cost for diabetic, low fat/cholesterol, and low sodium meals.

^e Data available from only one school; mean not calculated.

than the cost of the regular breakfast (Table B-5). The less expensive breakfasts might be due to the use of oatmeal and grits in place of other breakfast foods and the substitution of canned fruit for fresh fruit, especially if the canned fruit was a USDA commodity. The cost for pureed breakfasts at School 1 was lower even though on several days an extra carton of milk was used when food was pureed, and the price of this extra milk was added to the meal cost.

The average cost of pureed and ground lunch meals when compared to regular lunch meals was \$.02 less in School 1 and \$.10 less in School 2. The cost per meal for pureed and ground lunches was 4% less and 15% less in Schools 1 and 2, respectively. The cost of the pureed and ground lunches expressed as an average of both schools was 9% less than the cost of the regular lunch (Table B-5). The less expensive lunches might be attributed to the substitution of canned for fresh fruits and vegetables, especially when the canned products were USDA commodities.

School 2 was the only school in which special meals other than consistency modifications were prepared. Several types of modified meals were prepared such as diabetic, low fat/cholesterol, and low sodium. The average cost of these other special meals was \$.06 less than a regular meal for



breakfast and \$.17 less for lunch. The percent difference in cost per meal for the other special meals compared to regular meals was 17% less and 24% less for breakfast and lunch, respectively. Differences in cost at breakfast were associated with the substitution of toast for convenience breakfast breads such as donuts and blueberry muffins. Differences at lunch were primarily associated with deleting dessert from the menu and substituting plain meat for breaded meat items. For example, when School 2 received USDA commodity ground turkey, the cooks made turkey patties and froze them for special meal use. This item was assigned a cost of zero when food cost was calculated because it was made from a USDA commodity. When compared to a regular entree cost of \$.48, a considerable percent difference would result.



DISTRICT C

Demographic Information for District

District C consists of 57 schools and has a student enrollment of about 34,000. Approximately 75% of the children who eat lunch receive a free or reduced price meal. The district does not operate a special school for severely developmentally disabled children. Disabled children attend special classes in schools and also are included in traditional classrooms.

Special Food and Nutrition Services

The district school nutrition director estimated the number of children for whom specific menu modifications were being provided in the current school year 1993-1994 (Table C-1). The director indicated that approximately 50 children in the school district required some type of menu modifications. Many students receiving special meals required menu modifications other than those listed on Table C-1, such as no pork products because of religious restrictions, vegetarian meals, and no-sugar-added meals for attention deficit disorder (22 of 50).

The district school nutrition director indicated that guidelines on meal service for special needs children provided by the State Department of Education were being utilized in the district. The director stated that the district school nutrition program policy and procedure manual is being revised for the 1994-1995 school year and a section on the provision of meals to children with special food and nutrition needs will be included. The director reported that neither she nor any of her staff were registered dietitians. When asked who is responsible for making menu modifications to meet the special dietary needs of children in District C, the director responded that this responsibility varied depending on the severity of menu changes required. Requests for menu modifications are sent to the district school nutrition office for evaluation. If major menu changes are needed, the director or one of three area supervisors is responsible for making the menu modifications. An area supervisor works with the school nutrition manager to help plan the menu for the special diet. If consultation with a doctor or registered dietitian is required, the area supervisor makes the necessary contacts. Copies of the physicians' written diet orders are kept on file in the school nutrition manager's office and in the building principal's office. When a school nutrition manager receives a request such as "no pork" because of religious restrictions, she knows to make substitutions on the menu.

The district school nutrition director reported that each manager was responsible for the assurance of accurate production of special diets and menu modifications. If children require assistance with feeding, special education aides provide this service in each school. The special education teachers and aides are responsible for observing the consumption of special diets in the district.



Table C-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modification:			
Ground, regular	0	0	0
Pureed, regular	15	9	2
Other special modifications:			
Tube feedings	0	0	0
Diabetic	0	0	0
Low calorie	2	0	1
High calorie	0	0	0
Low fat/low cholesterol	2	0	0
Low sodium	1	0	0
Low protein	0	0	0
Milk allergies	5	1	0
Other food allergies	3	0	0
Between meal snacks	0	0	0
Other	22	0	1
Total	50	10	4

Communication

The district school nutrition office publishes a quarterly newsletter which is sent to all parents of children in District C. The director indicated that an article had been written concerning the availability of special meals for medical and religious reasons. Principals at all schools are aware that special meals can be provided to students when requested by an approved medical authority. When parents request special diets for their children, they are referred to the district school nutrition office.

Training

The district school nutrition director indicated that a training workshop is held each year prior to the beginning of school. Several years ago, a session was held for managers on providing meals to children with special food and nutrition needs. The majority of training is done on a



case by case basis. Each area supervisor trains the school nutrition managers under her supervision on how to meet the dietary needs of individual students. Both school nutrition managers responded that neither they nor their staff had attended any workshops on providing meals for children with special food and nutrition requirements.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that district office personnel spend in activities related to providing meals to children with special needs. Area supervisors also were interviewed and results are summarized in Table C-2. The district director spent 2 hours (120 minutes) each month on these activities. All of her time was spent in activities related to communicating with students, families, principals, teachers, managers, area supervisors, and food service staff. The three area supervisors spent over 7 hours (463 minutes) each month, the majority on activities related to communicating with students, families, principals, teachers, managers, food service staff, and the director. Additional time was expended in activities related to acquiring the physician's written diet order, planning meals, and purchasing special equipment items. An estimated 23 minutes per month of clerical time were spent on planning meals which included typing special menus and purchasing special food and equipment items which included typing equipment purchase orders and travel time to deliver purchase orders to the administrative office. The total time per month spent by district office personnel in activities related to providing meals for children with special needs was over 10 hours (606 minutes).

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians or nutritionists to counsel students or to plan special menus. Dietitians in private practice and from the health department and local hospitals have been contacted to clarify diet orders and review modified menus for children with special nutrition needs.

District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases have been made this school year to accommodate the diets of children with special needs. Food purchases averaged \$20.44 per month for low sodium vegetables and reduced sodium seasoning obtained from a local grocery store. These products were purchased for one child who since has left the school district. There were no special food items purchased by District C at this time. The director also reported that the district had purchased equipment such as blenders and food processors solely for the preparation of special diets. An estimated \$216 was spent this school year to purchase two blenders.



Table C-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs

Activity	Director	Area Supervisors*	Clerical	Total
	< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	0	30	0	30
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	120	305	0	425
Meeting with special education teachers to develop IEP	0	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	98	3	101
Getting bids on or purchasing special food or equipment items	0	30	20	50
Coordinating or conducting training of food service staff	0	0	0	0
Other activities	0	0	0	0
Total	120	463	23	606

* Minutes/month include time estimated by three area supervisors.



Demographic Information for Selected Schools

The two schools in District C selected for data collection housed kindergarten through fifth grade students. School 1 had an enrollment of 666 and an average daily lunch participation of 616 children with approximately 77% receiving free or reduced price meals. The school nutrition manager has a high school education and is State Department of Education and ASFSA certified.

School 2 had an enrollment of 217 and an average daily lunch participation of 214 children with approximately 89% receiving free or reduced price meals. The manager at School 2 has a high school education and is State Department of Education and ASFSA certified.

The school nutrition managers reported the number of children for whom specific menu modifications were being made (Table C-1). One child at School 1 is allergic to milk; however, juice was available at all meals so no special preparation was required. One menu modification at School 2, which was listed on Table C-1 as other lunch, was a no-sugar-added diet for a child with attention deficit disorder.

School Costs

School Indirect Labor Costs

Each school nutrition manager was asked to estimate the time she spent in activities related to providing meals for children with special food and nutrition needs (Table C-3). Both managers indicated that the majority of their time was spent on communication with the students, families, principals, teachers, director, area supervisors, and food service staff. The manager in School 1 reported that she spends 480 minutes each month observing consumption of special diets, 120 minutes each month planning meals, and 30 minutes per month securing special food items. An additional 2 minutes each month is spent by the manager in School 2 training employees who are preparing special meals. The school nutrition manager in School 1 is spending approximately 27 hours (1590 minutes) or about 159 minutes per child each month on activities related to providing meals to children with special food and nutrition needs. The manager at School 2 is spending approximately 2 hours (111 minutes) or about 28 minutes per child each month on activities related to providing meals to children with special food and nutrition needs. The majority of the time at School 1 was devoted to activities related to children on pureed diets. The difference in the estimated minutes per month spent by the school nutrition managers may be attributed to the amount of time available to attend to these issues. School 2 has a much smaller enrollment than School 1, and the manager at School 2 has more food production responsibility. School 2 also is involved in a pilot project to offer choices of entrees, vegetables, and fruit which may be requiring more of the manager's time.



Table C-3. Estimated indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
< ----- minutes/month ----- >		
Acquiring the physician's written diet order and communicating with physician	0	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	960	109
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	120	0
Securing special food or equipment items	30	0
Coordinating training for food service staff or participating in workshop conducted by others	0	2
Providing assistance in feeding children	0	0
Observing consumption of special diets	480	0
Total	1590	111



School Direct Labor Costs

School 1 employees recorded the direct labor time to prepare the pureed lunch meals. No breakfast meals were pureed because special education aides came to the cafeteria and transported regular breakfast trays to the classroom. Labor time used to prepare pureed lunches averaged 3 minutes per meal (Table C-4). The food service assistant who purees the meals checks with the special education teachers to determine how many children are in attendance each day. The food service assistant used portion control equipment to place food into compartment trays. Trays were covered with plastic wrap and placed in the food warmer. Children are brought to the cafeteria to be fed by the special education aides.

Employees at School 2 reported the labor time required to prepare the pureed and other special breakfast and lunch meals. Labor time for pureed breakfasts averaged 4 minutes per meal. A mean of 1 minute per meal was calculated for the labor time to prepare other special breakfast meals. Labor time for pureed lunch meals averaged 7 minutes per meal. The preparation of other special lunch meals required a mean labor time of 2 minutes per meal.

Mean minutes per meal for the preparation of pureed meals and other special meals were calculated for the two schools (Table C-4). The mean for pureed lunches for both schools in District C was 5 minutes per meal.

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Three cost averages were calculated based on five days of data: regular meals, pureed meals, and all other special meals such as low calorie and no-sugar-added. Food costs were compared at each school by calculating the difference between the regular meal and each of two types of special meals. The cost comparison expressed as a percentage also was calculated. (Refer to page 9 in the method section for specific formulas.)

The average cost of pureed breakfasts at School 2 was \$.05 more than the regular breakfast (Table C-5). The percent difference in the cost per meal for pureed breakfasts was 13% more for School 2. The percentage was high given such a small difference in cost because the total costs for both regular and pureed breakfasts were low. The cost differential in pureed breakfast meals may be attributed to the use of two muffins for the pureed meals while one muffin was on the regular breakfast menu.

The average difference between a regular and pureed lunch in School 1 was \$.01 less and \$.15 less than a regular lunch at School 2. The percent difference in the cost per meal for pureed lunches was 2% less and 19% less in Schools 1 and 2, respectively. The cost of the pureed lunches expressed as an average of both schools was 10% less than the cost of the regular lunch (Table C-5). Differences in cost at School 1 was associated with elimination of a sandwich bun at one meal. School 2 had a regular menu that offered choices of entrees, vegetables, and fruit.



Table C-4. Labor minutes per meal for preparation of pureed meals and other special breakfast and lunch meals

	School 1	School 2	Both Schools
< ----- mean minutes/meal ^a ----- >			
Pureed meals:			
Breakfast	---- ^b	4	---- ^c
Lunch	3	7	5 ^d
Other special meals:			
Breakfast	---- ^b	1 ^e	---- ^c
Lunch	---- ^b	2 ^e	---- ^c

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Data available for only one school; mean not calculated.

^d Average of data from schools 1 and 2.

^e Other special meals were no-sugar-added and low calorie.

Regular meal cost was calculated by averaging the cost of all food choices available. For children requiring pureed meals, the school nutrition manager chose items from the regular menu that pureed well. The less expensive lunches at School 2 might be attributed to the selection of the lower cost entree item on several days.

School 2 was the only school in which special meals other than consistency modifications were prepared. The types of modified diets that were prepared were low calorie and no-sugar-added. The cost of the other special meals was \$.12 less than the cost of regular breakfast meals and \$.11 less for lunch. The percent difference in cost per meal for the other special meals compared to regular meals was 28% less and 14% less for breakfast and lunch, respectively. Differences in cost at breakfast were associated with the substitution of toast for convenience breakfast breads such as blueberry muffins and french toast sticks and the elimination of sausage patties. Differences at lunch costs were primarily associated with the selection of less expensive entree choices and the elimination of desserts.



Table C-5. Comparison of food costs for special meals and regular meals

	School 1		School 2		Both Schools	
	Food cost comparison ^a		Food cost comparison ^a		Food cost comparison ^b	
	\$	%	\$	%	\$	%
Pureed meals:						
Breakfast	---- ^c	---- ^c	.05	13	---- ^d	---- ^d
Lunch	-.01	-2	-.15	-19	-.08	-10
Other special meals:						
Breakfast	---- ^c	---- ^c	-.12 ^e	-28	---- ^d	---- ^d
Lunch	---- ^c	---- ^c	-.11 ^e	-14	---- ^d	---- ^d

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b Average of data from schools 1 and 2.

^c This type of meal was not served in this school.

^d Data available from only one school; mean not calculated.

^e Other special food cost consisted of an average cost for no-sugar-added and low calorie meals.

Combined cost difference and percent difference per meal for pureed lunch meals compared to the regular lunch meals were calculated for the two schools (Table C-5). The mean cost difference and percent difference in cost per meal for pureed lunches compared to regular lunches in both schools were \$.08 less and 10% less, respectively.





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DISTRICT D

Demographic Information for District

District D consists of seven schools and has a student enrollment of about 5,400. Approximately 63% of the children who eat lunch receive a free or reduced price meal. The district, in cooperation with three other school districts, operates a special facility for severely developmentally disabled children. Disabled children also attend special classes in other schools in the district and are included in traditional classrooms.

Special Food and Nutrition Services

The district school nutrition director estimated the number of children for whom specific menu modifications were being provided in the current school year 1993-1994 (Table D-1). The director indicated that approximately eight children in the school district required some type of menu modification. The majority of the students (88%) receiving special meals required consistency modifications. The director indicated that she is aware of additional children in the district who require other diet modifications; however, the district school nutrition program has not been requested to provide special meals. The director stated that offer vs. serve and menus that offer choices of entrees, vegetables, and fruit have been implemented for all students in the district and this may be the reason few special diets have been requested.

The district school nutrition director indicated that guidelines on meal service for special needs children provided by the State Department of Education were being utilized in the district. The director reported that neither she nor any of her staff were registered dietitians. When asked who was responsible for making menu modifications to meet the special dietary needs of children in District D, the director responded that the manager at each school was responsible for making menu modifications. The school nutrition manager at School 1 indicated that she works with the head special education teacher to make menu modifications for the pureed diets. The special education teachers are sent a copy of the district's monthly lunch menus. The teachers make requests for substitutions based on the children's likes and dislikes and their knowledge of how the food will puree. The head special education teacher telephones the lunch count in to the manager each morning and they discuss what food items to give the children.

The district school nutrition director reported that each manager was responsible for the assurance of accurate production of the menu modifications. The school nutrition manager communicates with the special education teachers to ensure that the meals are pureed to the desired consistency. If children require assistance with feeding, special education teachers and aides provide this service in each school. The head special education teacher in each building is responsible for the observation of consumption of special diets in the district. The manager at School 2 indicated that she also attempts to talk to parents to determine children's food preferences.



Table D-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modifications:			
Ground, regular	0	0	0
Pureed, regular	7	5	2
Other special modifications:			
Tube feedings	1	0	0
Diabetic	0	0	0
Low calorie	0	0	0
High calorie	0	0	0
Low fat/low cholesterol	0	0	0
Low sodium	0	0	0
Low protein	0	0	0
Milk allergies	0	0	0
Other food allergies	0	0	0
Between meal snacks	0	0	0
Other	0	0	0
Total	8	5	2

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. The district school nutrition director and the special education director have an excellent working relationship. The district school nutrition office is willing to meet the needs of the disabled children as defined by the special education teachers. The director indicated that the special education teachers and school nutrition managers work as teams to provide meals for children with special food and nutrition requirements. When parents request special diets for their children, they are referred to the district school nutrition office. Copies of the physicians' written diet orders are filed in each school nutrition manager's office and in the office of the district special education director.



Training

The district school nutrition director indicated that no formal group training session had been conducted for district employees on the preparation of meals for children with special food and nutrition requirements. The majority of training is done by the special education teacher with the school nutrition manager on appropriate menu items and desired consistency of pureed meals for individual students. Both school nutrition managers interviewed in this study responded that neither they nor their staff had attended any workshops on providing meals for children with special food and nutrition requirements.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that district office personnel spend in activities related to providing meals to children with special needs, and results are summarized in Table D-2. The district director spent over 1 hour (81 minutes) each month on these activities. The majority of her time was spent in activities related to purchasing special food or equipment. Additional time was expended in activities related to communicating with students, families, principals, teachers, managers, and food service staff and acquiring the physician's written diet order. No clerical labor time in the district office was spent on activities related to providing meals to children with special needs.

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians or nutritionists to counsel students or to plan special menus. Previously, dietitians from local hospitals have contacted the district school nutrition director to inform her of children who are on diabetic diets. The director usually asks the dietitians to call the school nutrition manager to inform her of the specific requirements of the child's diet.

District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases were made during the 1993-1994 school year to accommodate the diets of children with special needs. All of the purchased food products were designated for the children requiring consistency modifications. Special food purchases averaged \$15 per month. Supply items such as disposable tray inserts are being purchased for special education meals at School 1. Supply items purchased for special needs by the district averaged \$25 per month for approximately 12 meals. Pureed and regular meals are being packaged in insulated trays and transported to a remote location for service. The director reported that the district previously had purchased equipment such as blenders, insulated trays, and special eating utensils for the preparation and service of special meals. An estimated \$35 was spent this school year to purchase one blender.



Table D-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs

Activity	Director	Clerical	Total
< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	1	0	1
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	20	0	20
Meeting with special education teachers to develop IEP	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	0	0
Getting bids on or purchasing special food or equipment items	60	0	60
Coordinating or conducting training of food service staff	0	0	0
Other activities	0	0	0
Total	81	0	81



The district director indicated that funds from sources other than the school nutrition program have not been used to pay expenses associated with the preparation and service of meals to children with special food and nutrition needs.

Demographic Information for Selected Schools

School 1 housed pre-kindergarten through eighth grade and had an enrollment of 775. Approximately 643 children ate lunch daily with about 77% receiving free or reduced price meals. The school nutrition manager has less than a high school education and is State Department of Education and ASFSA certified. School 2 housed kindergarten through eighth grade and had an enrollment of 400. School 2 had an average daily lunch participation of 360 children with approximately 59% receiving free or reduced price meals. The manager at School 2 has a high school education and is State Department of Education and ASFSA certified.

The school nutrition managers reported the number of children for whom specific menu modifications were being made (Table D-1). Employees at School 1 were preparing pureed meals for five children at the special education satellite facility. One child at the facility served by School 1 received food supplements as his sole source of nutrition. The school nutrition program had been purchasing the formula for the child last year; however, a home health agency was furnishing the supplement this year. The manager at School 2 reported that two children presently were receiving pureed meals. She also indicated that in the past they have had up to seven children who received special meals; however, due to building renovations, the children have been relocated.

School Costs

School Indirect Labor Costs

Each school nutrition manager was asked to estimate the time she spent in activities related to providing meals to children with special food and nutrition needs (Table D-3). The manager in School 1 reported that the majority of her time (240 minutes) was spent on communication with students, families, principals, teachers, supervisors, and food service staff. She also spent 160 minutes each month going to the grocery store to purchase special food items. An additional 7 minutes per month were spent by the manager in School 1 training the employees who are preparing the pureed meals. The school nutrition manager in School 1 was spending over 6 hours (407 minutes) or about 81 minutes per child each month on activities related to providing meals to children with special food and nutrition needs.

The manager at School 2 reported that the majority of her time was spent observing consumption of special diets (80 minutes). She also spent 40 minutes each month going to the grocery store to purchase special food items. An additional 20 minutes per month was spent on communication with



Table D-3. Estimated indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
< ----- minutes/month ----- >		
Acquiring the physician's written diet order and communicating with physician	0	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	240	20
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	0
Securing special food or equipment items	160	40
Coordinating training for food service staff or participating in workshop conducted by others	7	0
Providing assistance in feeding children	0	0
Observing consumption of special diets	0	80
Total	407	140



students, families, principals, teachers, supervisors, and food service staff. The school nutrition manager at School 2 was spending approximately 2 hours (140 minutes) or about 70 minutes per child each month on activities related to the provision of meals to children with special food and nutrition needs.

School Direct Labor Costs

School 1 employees recorded the direct labor time to prepare the pureed meals that were sent to the satellite facility for children with developmental disabilities. No breakfast meals are pureed for children at this facility and pureed meals were the only special meals prepared in both schools. Children were bussed to the facility from surrounding counties and many did not arrive until late morning. Labor time for preparation of lunch meals averaged 7 minutes per meal (Table D-4).

Additional labor was reported at School 1 for the packaging of regular and pureed meals that are transported to the satellite facility. All regular and pureed meals sent to the satellite facility were placed on disposable inserts in insulated trays for transport. Accompaniments such as crackers, fresh fruit, milk, and juice were packed in boxes. Items such as soup were transported in bulk and portioned on site. The mean assembly time for lunch was 2 minutes per meal. A driver from the satellite facility picked up the trays and other food items each day around 10:30 a.m. The head special education teacher was responsible for ensuring that each child was served a lunch that meets meal pattern requirements. Food portioning equipment was available at the satellite school.

Employees at School 2 reported the labor time required to prepare pureed breakfasts and lunch meals. Labor time for pureed breakfasts averaged 3 minutes per meal. A mean of 6 minutes per meal was calculated as the labor time needed to prepare pureed lunch meals. Mean minutes per meal for the preparation of pureed meals were calculated for the two schools (Table D-4). The mean for pureed lunch for both schools in District D was 6 minutes per meal.

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Two cost averages for regular and pureed meals were calculated based on five days of data. There were no other special meals in the schools. Food costs were compared at each school by calculating the difference between the food cost of regular meals and the food cost of pureed meals. The cost comparison expressed as a percentage also was calculated. (Refer to page 9 in the method section for specific formulas.)

The average cost of a pureed breakfast at School 2 was \$.04 more than the cost of a regular breakfast. The percent difference in the cost per meal for pureed breakfasts was 10% more for School 2. The percentage was high given such a small difference in cost because the total costs for both regular and pureed breakfasts were low. The cost differential in pureed breakfast meals may be attributed to the use of instant grits purchased from the grocery store for the pureed meals while homemade muffins were on the regular breakfast menu.



Table D-4. Labor minutes per meal for preparation of pureed meals, delivery of special education meals, and preparation of other special breakfast and lunch meals

	School 1	School 2	Both Schools
< ----- mean minutes/meal ^a ----- >			
Pureed meals:			
Breakfast	---- ^b	3	---- ^c
Lunch	7	6	6 ^d
Special education tray delivery:			
Lunch	2	---- ^b	---- ^c
Other special meals:			
Breakfast	---- ^b	---- ^b	---- ^b
Lunch	---- ^b	---- ^b	---- ^b

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Data available for only one school; mean not calculated.

^d Average of data from schools 1 and 2.

The average cost of pureed lunch as compared to regular lunch was \$.03 more in School 1 and \$.11 more for School 2. The percent difference in the cost per meal for pureed lunches was 5% and 22% more in Schools 1 and 2, respectively. The cost of the pureed lunches expressed as an average of both schools was 13% more than the cost of the regular lunch (Table D-5). The difference in cost at School 1 was associated with use of an extra carton of milk to blenderize the food on one day, and the price of this extra milk was added to the meal cost. The more expensive lunches at School 2 might be attributed to the use of an extra carton of milk to blenderize the food and the use of canned products, such as ravioli, purchased from the local grocery store for the pureed meals.



Table D-5. Comparison of food costs for special meals and regular meals

	School 1		School 2		Both Schools	
	<u>Food cost comparison^a</u>		<u>Food cost comparison^a</u>		<u>Food cost comparison^b</u>	
	\$	%	\$	%	\$	%
Pureed meals:						
Breakfast	--- ^c	--- ^c	.04	10	--- ^d	--- ^d
Lunch	.03	5	.11	22	.07	13
Other special meals:						
Breakfast	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c
Lunch	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c	--- ^c

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b Average of data from schools 1 and 2.

^c This type of meal was not served in this school.

^d Data available from only one school; mean not calculated.





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DISTRICT E

Demographic Information for District

District E consists of 152 schools and has a student enrollment of about 109,000. Approximately 62% of the children who eat lunch receive a free or reduced price meal. The district operates two special schools for severely developmentally disabled children. Disabled children also attend special classes in other schools, or they are included in traditional classes.

Special Food and Nutrition Services

The three area supervisors in the district who coordinate the modification of meals for children with special food and nutrition needs estimated the number of children in the district receiving this type of service in the current school year 1993-1994 (Table E-1). The supervisors indicated that this estimate is not accurate for children who only receive consistency modifications because the school nutrition managers in coordination with special education teachers take primary responsibility for these meals. Three children in the district require meals that are altered in protein content. Two of these children have maple syrup urine disease and one has phenylketonuria (PKU).

The district school nutrition director indicated that the school district has written guidelines on meal service for special needs children and a copy is provided in the school nutrition manager's handbook. Five registered dietitians (RDs) were employed by the school nutrition program. All work at the district level as area supervisors, nutrition instructors, or the nutrition services dietitian. When asked who was responsible for making the menu modifications to meet the special food and nutrition needs of children in District E, the director responded that the nutrition services dietitian, along with some help from two other RDs, was given that responsibility. A four-week cycle menu is planned for each type of health condition requiring modified meal preparation. These menus are closely aligned to the regular menu, which allows the manager to minimize special food production.

The director reported that the nutrition services dietitian and the area supervisors were responsible for the assurance of accurate production of special diets and menu modifications. The school nutrition manager communicates with the special education teachers to ensure that the meals are pureed to the desired consistency. If children require assistance with feeding, special education aides provide this service in each school. The school nutrition manager and the area supervisors are responsible for observing the consumption of special meals in the district, and occasionally the nutrition services dietitian will become involved.



Table E-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modifications:			
Ground, regular	--- ^a	0	0
Pureed, regular	--- ^a	10	0
Other special modifications:			
Tube feedings	--- ^a	0	0
Diabetic	2	0	1
Low calorie	2	0	0
High calorie	2	0	0
Low fat/low cholesterol	0	0	0
Low sodium	0	0	0
Low protein ^b	3	0	1
Milk allergies	0	0	0
Other food allergies	--- ^a	6	0
Between meal snacks	0	0	0
Other	0	0	0
Total	19	16	2

^a This information was not available in the district school nutrition office.

^b Included children with maple syrup urine disease and PKU.

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. The physician sends the written diet order to the school and the principal gives the diet order to the school nutrition manager. The manager, in turn, advises the district office and the district dietitian in charge of that type of diet plans a cycle menu that coordinates with the regular school menu. For some developmentally disabled children, the Center for Childhood Diseases in the district contacts the nutrition services dietitian directly to have special meals prepared for students. This was done, for example, for the children receiving meals modified for PKU and maple syrup urine disease. Documentation of physician's written diet orders is held only at the school level.



Training

The district school nutrition director coordinates the training of managers and food service employees. The nutrition services dietitian and the two other RDs involved with the special meals conduct sessions on modifying meals with employees throughout the district. Much of the training is on an "as needed" basis when parents request a modified meal for their child. No recent group training on special meals had occurred.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that she spends in activities related to providing meals to children with special needs, and results are summarized in Table E-2. The director spent 15 hours (926 minutes) each month on these activities. The majority of her time (533 minutes) was spent in purchasing special food or equipment items. Approximately 133 minutes per month was spent on other activities related to community relations. She told the NFSMI research scientists of an occasion when a hospitalized child requested that school nutrition program-prepared pizza be brought to the hospital because it was such "good pizza". The district school nutrition director personally delivered the pizza. This generated local media coverage and wonderful publicity for the types of services, including those for children with special health needs, offered in the district.

The nutrition services dietitian and the other two RDs involved with providing meals for children with special needs also estimated the time they spent each month working in this area. The three RDs spent over 22 hours (1335 minutes) per month in activities related to children with special food and nutrition needs. Most of their time was spent in planning menus, acquiring the physician's written diet order, and communicating with students, families, principals, managers, and food service staff. Initially the district school nutrition director estimated that clerical staff in the district office spent zero time on activities related to providing meals to children with special needs. After data analyses were completed, the director indicated that clerical staff spends approximately 2 hours (120 minutes) per month typing menus for children with special needs. Total time per month spent by district office personnel in activities related to providing meals to children with special needs was almost 38 hours (2261 minutes).

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians to counsel students or plan special menus because RDs are employed in the district. There are, therefore, no direct labor costs in this district associated with providing meals to children with special needs. Dietitians from local hospitals, county and state health departments, State Department of Education, and college faculty have donated consulting time to the school nutrition programs to help students with special needs. They primarily serve to clarify the child's medical condition, suggest procedures to follow with a





Table E-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special need

Activity	Director	Area Supervisors ^a	Clerical	Total
< ----- minutes/month ----- >				
Acquiring the physician's written diet order and communicating with physician	0	302	0	302
Communicating with student, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	60	253	0	313
Meeting with special education teachers to develop IEP	0	120	0	120
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	120	420	0	540
Getting bids on or purchasing special food or equipment items	533	45	0	578
Coordinating or conducting training of food service staff	80	195	0	275
Other activities	133	0	0	133
Total	926	1335	0	2261

^a Minutes/month include time estimated by three area supervisors.

specific diet, and submit sample menus for school nutrition programs dietitians to use as meal patterns.

District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases were being made to accommodate children with special needs. Types of food purchased were strained fruit and meat, rice cereal, and junior vegetables. Special food purchases by the district averaged \$419 per month. No food service equipment associated with the preparation of special meals was purchased this school year. Five food processors were purchased two years ago at a total cost of \$978.

The district school nutrition director indicated that funds from sources other than school nutrition programs are used to purchase items associated with the preparation and service of meals to children with special needs. Special education funds are used to purchase tube feedings and other nutritional supplements as well as special eating utensils.

Demographic Information for Selected Schools

The two schools in District E selected for data collection both housed kindergarten through sixth grade students. School 1 provided pre-kindergarten classes for disabled children. School 1 had an enrollment of 535 and an average daily lunch participation of 408 children with approximately 73% receiving free or reduced price meals. The school nutrition manager has a high school degree.

School 2 had an enrollment of 1000 and an average daily lunch participation of 924 children with approximately 94% receiving free or reduced price meals. The manager at School 2 has a high school degree, and she is State Department of Education and ASFSA certified.

The school nutrition managers reported the number of children for whom specific diet modifications were being made (Table E-1). School 1 had menu choices so the six children with fish and cheese allergies could be accommodated by helping these children make appropriate choices at the serving line. One child in the school received a tube feeding, but school nutrition programs employees did not furnish or administer the feeding; therefore, it was not counted in the total number of children receiving special meals. The low protein menu modification at School 2 was for a child with maple syrup urine disease. Approximately 11 children at School 2 received meals modified in consistency. The pureed meals were not counted in the total for School 2 because the special education teachers were blenderizing regular meals in the dining room; therefore, school nutrition programs personnel did not incur extra labor in conjunction with these meals.



School Costs

School Indirect Labor Costs

Each manager was asked to estimate the time she spent in activities related to providing meals to children with special needs (Table E-3). The manager in School 1 estimated that she spent approximately 6 hours per month (360 minutes/month) communicating with students, families, principals, teachers, area supervisors, and food service staff about providing special meals for the children. The manager in School 2 spent almost 9 hours (518 minutes) in the same activity. The total time per month the managers spent in administering the special meals program was approximately 7 hours (437 minutes) and 9 hours (558 minutes) in Schools 1 and 2, respectively. The manager in School 1 spent an additional 340 minutes per month in monitoring the trayline when special education teachers came to take meals back to their classroom at lunch. This time was not associated with modified meal preparation, but it represented approximately 17 minutes per day that the manager was not available to do other types of supervision.

The amount of indirect labor per child with a special food and nutrition requirement was 27 minutes per month for School 1 and 279 minutes or approximately 5 hours for School 2. The special meals prepared in School 1 were modified in consistency only, whereas the manager in School 2 was required to provide meals for children with more complicated health conditions, such as diabetes and maple syrup urine disease. More time was spent by the manager in School 2 in communicating about special meals, especially with the nutrition services dietitian, and in observing the children's consumption of food.

School Direct Labor Costs

School 1 employees recorded the direct labor time to prepare the pureed breakfast and lunch meals. Labor time for preparation of meals averaged 1 minute per meal (Table E-4). The mean additional direct labor time to prepare a pureed lunch was 2 minutes. School 1 had no other type of special meal for which preparation was required.

Employees at School 2 reported the labor time required to prepare other special lunch meals. The children requiring special meals did not eat breakfast at the school. The average labor time was 19 minutes per lunch meal for children requiring diabetic and low protein modifications to their meals (Table E-4).

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Three cost averages were calculated based on five days of data: regular meals, pureed meals, and all other special meals such as diabetic and low protein. Food costs were compared at each school by calculating the difference between the food cost of regular meals and the food costs of each of



Table E-3. Estimated indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
< ----- minutes/month ----- >		
Acquiring the physician's written diet order and communicating with physician	60	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	360	518
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	17	0
Securing special food or equipment items	0	0
Coordinating training for food service staff or participating in workshop conducted by others	0	0
Providing assistance in feeding children	0	0
Observing consumption of special diets	0	40
Total	437	558



Table E-4. Labor minutes per meal for preparation of pureed meals and other special breakfast and lunch meals

	School 1	School 2
< ----- mean minutes/meal ^a ----- >		
Pureed meals:		
Breakfast	1	--- ^b
Lunch	2	--- ^b
Other special meals:		
Breakfast	--- ^b	--- ^b
Lunch	--- ^b	19 ^c

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Other special meals were diabetic and maple syrup urine disease/low protein.

two types of special meals. The cost comparison expressed as a percentage was calculated also. (Refer to page 9 in the method section for specific formulas.) There was no difference between a regular and pureed breakfast in School 1 (Table E-5). The average cost difference between a regular and pureed lunch in School 1 was \$.02 less for pureed lunches. The percent difference in the cost per meal for pureed lunches as compared to regular lunches was 3% less. The percent difference was relatively high given such a small difference in cost because the total costs for both regular and pureed lunches were low. School 1 had a regular menu that offered a choice of entrees, vegetables, and fruit. Regular meal cost was calculated by averaging the cost of all food choices available. For children requiring meals with consistency modifications, the school nutrition manager chose items from the regular menu that pureed well. These choices were lower cost items in some instances. For example, on one day students had a choice of weiner on bun versus chicken tenders. The average price for the two entrees was \$.20, and the manager chose to puree the weiner and bun which had a cost of \$.14. This may account for the slight decrease in the cost of pureed lunches. School 1 also incurred extra paper costs because special education teachers transported meals to the classroom. Extra paper costs were about \$217 per month for hinged compartment trays, garbage bags, and napkins.

School 2 was the only school of the two that prepared types of special meals other than consistency modifications. Modified meals were prepared for children with diabetes and maple syrup urine disease. No special meals were prepared for breakfast. The cost of special lunch meals was \$.08 less



Table E-5. Comparison of food costs for special meals and regular meals

	School 1		School 2	
	Food cost comparison ^a		Food cost comparison ^a	
	\$	%	\$	%
Pureed meals:				
Breakfast	.00	0	--- ^b	--- ^b
Lunch	-.02	-3	--- ^b	--- ^b
Other special meals:				
Breakfast	--- ^b	--- ^b	--- ^b	--- ^b
Lunch	--- ^b	--- ^b	-.08 ^c	-13

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b This type of meal was not served in this school.

^c Other special food cost consisted of an average cost for diabetic and maple syrup urine disease/low protein meals.

than the cost of regular meals. The percent difference in cost per meal for the other special meals as compared to regular meals was 13% less. The lower cost at lunch was associated with deleting entree items from the low protein meal. A special amino acid formula brought from home supplemented the fruits and vegetables prepared by school nutrition programs. School 2 also supplied disposable hinged compartment trays for transporting approximately 15 regular meals per day to the special education classroom at a cost of \$.04 per tray.





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DISTRICT F

Demographic Information for District

District F consists of 120 schools with a student enrollment of about 82,000. Approximately 92% of the children who eat lunch receive a free or reduced price meal. The district does not operate schools for children with developmental disabilities. Children with disabilities attend special classes in schools in the district, or they are included in traditional classes.

Special Food and Nutrition Services

A district supervisor who coordinates the modification of meals for children with special food and nutrition requirements estimated the number of children in the district receiving this type of service in the current school year 1993-1994 (Table F-1). Fifteen children used canned nutritional supplements. The child receiving a low protein meal also had a phosphorus restriction. The low sodium meal was simply a "no salt added" regimen. Two children are lactose intolerant, and one child is allergic to tomatoes, and wheat and rye flours.

The district school nutrition director indicated that the school district has written guidelines on meal service for special needs children and a copy is provided to the school nutrition managers. She also stated that the amount of meal modifications made in the district was relatively small due to the fact that the district had been making concerted efforts to plan menus in accordance with the *U.S. Dietary Guidelines for Americans* and that menu choices had been implemented in most schools. These two factors provided for the food preparation techniques and variety of food that allowed the needs of children with special food and nutrition requirements to be met from the regular menu. The district supervisor who works with the special meals program is the only registered dietitian working in the district school nutrition program. When asked who was responsible for making the menu modifications to meet the special food and nutrition needs of children in District F, the director responded that the district supervisor was given that responsibility.

The director reported that the district supervisor, through the school nutrition managers, was responsible for the assurance of accurate production of meals modified for children with special food and nutrition needs. The managers communicate with special education teachers to ensure that the meals are pureed to the desired consistency. If children require assistance with feeding, special education aides provide this service in each school. The school nutrition manager and other school nutrition programs employees are not responsible for observing consumption of special meals. The children are closely monitored by the teachers.



Table F-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modifications:			
Ground, regular	0	0	0
Pureed, regular	5	0	1
Other special modifications:			
Tube feedings	15	0	5
Diabetic	5	0	0
Low calorie	1	1	0
High calorie	0	0	0
Low fat/low cholesterol	3	1	0
Low sodium	1	0	0
Low protein*	1	1	0
Milk allergies	2	1	0
Other food allergies	1	2	1
Between meal snacks	0	0	0
Other	0	0	0
Total	34	6	7

* This is a low protein/low phosphorus special meal.

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. The school nutrition manager gives each child who requests a special meal a form to take home for parents to give to their physician. This form is given back to the manager who sends it to the district supervisor in charge of special meals. She verifies the diet order and discusses menu modifications with RDs and/or physicians if necessary. The district supervisor then makes a list of approved modifications to the regular menu and sends it to the manager along with a copy of the physician's written diet order. Specific menus or modified cycle menus are not developed. Each manager uses the diet information supplied by the district



in working with teachers, parents, and children. The district supervisor is available by telephone if specific problems arise. Any changes to the diets have to be verified by the district supervisor.

Training

The district supervisor trains managers and food service employees on steps to be taken in modifying meals for children with special needs. The training is on an "as needed" basis when parents request a meal modified for their child's nutritional needs. No recent group training on special meals had occurred.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that she spends in activities related to providing meals to children with special needs, and results are summarized in Table F-2. The director spent only 10 minutes a month on activities of this nature because she delegated the administration of special meals to the RD district supervisor.

The district supervisor in charge of the special meals program estimated the time she spent each month working in this area. She spent over 24 hours (1440 minutes) per month or three work days acquiring and clarifying the physicians' diet orders (Table F-2). Another 25 hours (1500 minutes) per month were spent in communicating with students, families, principals, managers, and food service staff. Total time per month spent by the district supervisor in activities related to providing meals to children with special needs was almost 55 hours (3287 minutes) or well over one week's total labor time (based on a 40-hour week).

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians to counsel students or plan special menus because one registered dietitian is employed at the district level and has been given the responsibility to administer the program for children with special food and nutrition needs. There are, therefore, no direct labor costs in this district associated with providing meals for these children. Dietitians from local hospitals have donated consulting time to school nutrition programs to help students with special needs. They primarily serve to clarify the child's medical condition, suggest procedures to follow with a specific diet, and submit sample menus for the school nutrition programs dietitian to use as meal patterns. Dietitians from the State Department of Education helped develop the forms used in the district to document special food and nutrition requests.





Table F-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs.

Activity	Director	Area Supervisors	Clerical	Total
	< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	0	1440	0	1440
Communicating with student, family, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	0	1500	0	1500
Meeting with special education teachers to develop IEP	0	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	0	0	0
Getting bids on or purchasing special food or equipment items	0	240	0	240
Coordinating or conducting training of food service staff	10	107	0	127
Other activities	0	0	0	0
Total	10	3287	0	3297

District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases were being made to accommodate children with special needs. Food products purchased were canned nutritional supplements. Special food purchases averaged \$704 per month. Five blenders were purchased this school year at a cost of \$445. This equipment was used in schools where consistency modifications were made. The district school nutrition director indicated that only school nutrition programs funds are used to purchase items associated with the preparation and service of meals to children with special needs.

Demographic Information for Selected Schools

The two schools in District F selected for data collection both housed pre-kindergarten through fifth grade students. Both schools provided special education classes. School 1 had an enrollment of 905 and an average daily lunch participation of 852 children with approximately 97% receiving free or reduced price meals. The school nutrition manager has a high school degree, and she is State Department of Education certified.

School 2 had an enrollment of 605 and an average daily lunch participation of 561 children with approximately 97% receiving free or reduced price meals. The manager at School 2 has a high school degree, and she is State Department of Education certified.

The school nutrition managers reported the number of children for whom specific diet modifications were made (Table F-1). The child who required a low fat meal at School 1 also was restricted from eating pork. The child with a protein restriction also was limited in phosphorous intake. The School 1 manager also was providing special meals for several children with food allergies. One child was lactose intolerant, one was allergic to seafood, and another was allergic to seafood and milk products. There was a child at School 2 who was allergic to seafood, and the remaining special meals were for children in special education classes.

School Costs

School Indirect Labor Costs

Each manager was asked to estimate the time she spent in activities related to providing meals to children with special needs (Table F-3). The manager in School 1 estimated that she spent approximately 30 hours per month (1800 minutes/month) communicating with students, families, principals, teachers, district supervisor, and food service staff about providing special meals for the children. The manager in School 2 spent 2 hours (120 minutes) in the same type of activity. The total time per month the managers spent in administering the special meals program was approximately 38 hours (2269 minutes) and 2 and 1/2 hours (150 minutes) in Schools 1 and 2, respectively.



Table F-3. Estimated indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
	< ----- minutes/month ----- >	
Acquiring the physician's written diet order and communicating with physician	0	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	1800	120
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	109	0
Securing special food or equipment items	0	30
Coordinating training for food service staff or participating in workshop conducted by others	360	0
Providing assistance in feeding children	0	0
Observing consumption of special diets	0	0
Total	2269	150



The amount of indirect labor per child with a special food and nutrition need was 378 minutes or approximately 6 hours per month for School 1 and 21 minutes for School 2. The manager of School 1 was particularly anxious to please parents and students who required special meals. She took the time each morning to make sure that each child was in school and to check with them regarding what they would like to eat for lunch that day, given the posted menu. She appeared to be accommodating individual student likes and dislikes within the constraints of time and resources. One or two additional children came to her with special food and nutrition needs within the data collection period, and she swiftly met their requests. The special meals prepared in School 2 were modified in texture only, and the manager seemed to have a good working relationship with the special education teachers.

School Direct Labor Costs

School 1 employees recorded the direct labor time to prepare special meals. No special meals were served for breakfast in this school. The mean additional direct labor time to prepare lunches for children requiring low protein, low fat, and several food allergy meal modifications was 19 minutes (Table F-4). School 1 had no other type of special meals for which preparation was required.

Employees at School 2 reported the labor time required to prepare pureed and other special meals for lunch. The children requiring special meals did not eat breakfast at the school. The average labor time to prepare a pureed, low sodium lunch was 15 minutes per meal (Table F-4). School 2 also had meals categorized as "other", but the preparation required for these meals was simply the dispensing of canned nutritional supplements to be given to the children by special education teachers. It did take, however, an average of 1 minute per meal to retrieve the supplements from the storeroom and have them ready for the special education teachers to take back to the classrooms. The mean minutes per meal for the preparation of other special meals were calculated for the two schools (Table F-4).

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Three cost averages were calculated based on five days data: regular meals, pureed meals, and all other special meals such as low protein and food allergies. Food costs were compared at each school by calculating the difference between the regular meal and each of two types of special meals. The cost comparison expressed as a percentage was calculated also. (Refer to page 9 in the method section for specific formulas.)

No pureed or other breakfast meals were served in either school, and School 1 did not serve any meals modified in consistency. The average cost of pureed lunch meals in School 2 was \$.09 more than the cost of regular meals (Table F-5). The percent difference in cost per meal for pureed lunches as compared to regular lunches was 15% more. The percent difference was relatively high given such



Table F-4. Labor minutes per meal for preparation of pureed meals and other special breakfast and lunch meals

	School 1	School 2	Both Schools
< ----- mean minutes/meal ^a ----- >			
Pureed meals:			
Breakfast	---- ^b	---- ^b	---- ^b
Lunch	---- ^b	15	---- ^c
Other special meals:			
Breakfast	---- ^b	---- ^b	---- ^b
Lunch	19 ^d	1 ^e	10 ^f

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Data available for only one school; mean not calculated.

^d Other special meals were low protein, low fat, and food allergies.

^e Other special meals were canned nutritional supplements.

^f Average of data from schools 1 and 2.

a small difference in cost because the total costs for both regular and pureed lunches were low. The difference in cost was associated with the use of one pint of skim milk on four of the five days to thin the consistency of the pureed meals.

Other special meals were served for lunch in both schools. School 1 served modified meals prepared for children requiring low protein/low phosphorus, low fat, and food allergy meal modifications. The average cost of other special lunch meals was \$.01 less than the cost of regular meals. The percent difference in cost per meal for the other special meals was 1% less than regular meals (Table F-5). School 2 served canned nutritional supplements as their other special meals. The difference between the cost of the regular meal and the average cost of these supplements was \$1.83. The percent difference in cost per meal was 290% more than the cost of regular meals. The difference in cost of other special meals as compared to regular meals for both schools averaged \$.91 more, yielding a 144% difference.



Table F-5. Comparison of food costs for special meals and regular meals

	School 1		School 2		Both Schools	
	Food cost comparison ^a		Food cost comparison ^a		Food cost comparison ^b	
	\$	%	\$	%	\$	%
Pureed meals:						
Breakfast	---	---	---	---	---	---
Lunch	---	---	.09	15	---	---
Other special meals:						
Breakfast	---	---	---	---	---	---
Lunch	-.01 ^e	-1	1.83 ^f	290	.91	144

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b Average of data from schools 1 and 2.

^c This type of meal was not served in this school.

^d Data available from only one school; mean not calculated.

^e Other special food cost consisted of an average cost for low protein, low fat, and food allergy meals.

^f Other special meals were canned nutritional supplements.





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DISTRICT G

Demographic Information for District

District G was the small district in which the pilot study was conducted. It consists of 4 schools with a student enrollment of about 3,300. Approximately 41% of the children who eat lunch receive a free or reduced price meal. The district does not operate special schools for severely developmentally disabled children. Children with disabilities attend special education classes in the schools or are included in traditional classes.

Special Food and Nutrition Services

The school nutrition director stated that approximately 65 students in the district received modified meals in this current school year 1993-1994 (Table G-1). Only 1 of the 57 physician's written diet orders concerning milk allergy specifically stated lactose intolerance. The other food allergy diet order was for a child who had migraine headaches after eating several types of food, primarily those which contain nitrates. All special meal requests were handled by the director who verified the physician's written diet order and trained the school nutrition manager on menu modification procedures to be followed.

The district director indicated that guidelines on meal service for special needs children provided by the State Department of Education were being utilized in the district. The director reported that neither she nor any of her staff were registered dietitians. When asked who was responsible for making the menu modifications to meet the special food and nutrition needs of children in District G, the director responded that she worked with parents, the physician, nurse, or dietitian at local hospitals.

The director reported that each school nutrition manager was responsible for the assurance of accurate production of special diets and menu modifications. The manager communicates with the special education teachers to ensure that the meals are pureed to the desired consistency. If children require assistance with feeding, special education aides provide this service in schools. The teachers or teachers' aides at each school are responsible for observing the consumption of special meals in the district.

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. Parents are informed that a written diet order, signed by a physician or an approved medical authority, is required before menu modifications can be implemented. The director sends each parent a menu to be altered according to the health needs of the child. For example, the parent will mark through items the child cannot have and suggest possible substitutions. The parent then signs the altered menu and sends it back to the



Table G-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1
<hr/>		
	< ----- number of children ----- >	
Consistency modifications:		
Ground, regular	0	0
Pureed, regular	2	2
Other special modifications:		
Tube feedings	0	0
Diabetic	4	2
Low calorie	0	0
High calorie	0	0
Low fat/low cholesterol	1	1
Low sodium	0	0
Low protein	0	0
Milk allergies	57	1
Other food allergies	1	1
Between meal snacks	0	0
Other	0	0
Total	65	7

director or the school nutrition manager at the child's school. A copy of the signed menu is filed in the district school nutrition director's office and another is sent to the school nutrition manager for implementation. The director trains the manager and food service staff on food production techniques necessary to comply with the diet order. The deletions and substitutions indicated by parents are reviewed by the director and manager who consider factors such as physician's diet order, cost, USDA meal pattern compliance, and availability of food.



Training

The district school nutrition director either trains the food service staff personally or arranges for training. A few years ago when pureed diets were first needed in the district, the director arranged for a local hospital dietitian to demonstrate to food service employees specific techniques for preparing pureed meals. She spent one day in the district conducting this training session. No other formal training sessions on providing special meals have been held in the district.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that district office personnel spend in activities related to providing meals to children with special needs, and results are summarized in Table G-2. The director spent 27 hours (1603 minutes) each month on these activities. The major portion of her time was spent in activities related to communicating with students, families, principals, teachers, managers, and food service staff and purchasing special food or equipment items. Approximately 5 hours (300 minutes) per month of clerical time was spent in typing letters and menus for parents of children with special needs. Total time per month spent by district office personnel in activities related to providing meals to children with special needs was almost 32 hours (1903 minutes).

District Direct Labor Costs

At the time of data collection, the district was not contracting with registered dietitians or nutritionists to counsel students or to plan special menus, but the director was contemplating doing so. A dietitian had been hired previously for approximately 30 hours to train employees on blenderizing food and to write special menus. Dietitians from local hospitals, the county health department, and private consulting practice have donated consulting time to the school nutrition program to help students with special needs. These services have been provided at different times for approximately five children in the district.

On follow-up interview, the NFSMI research scientists found that a registered dietitian was hired in the district to help plan menus and train foodservice employees. The RD verified diet orders with physicians, planned menus for seven children, and trained the school nutrition manager and food service employees. The time amounted to approximately 4 hours per child of direct labor associated with the provision of meals to children with special needs.



Table G-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs

Activity	Director	Clerical	Total
< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	140	0	140
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals.	1200	300	1500
Meeting with special education teachers to develop IEP	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	20	0	20
Getting bids on or purchasing special food or equipment items	210	0	210
Coordinating or conducting training of food service staff	33	0	33
Other activities	0	0	0
Total	1603	300	1903



District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases were being made to accommodate children with special needs. The majority of purchased food products were designated for children who were on diabetic diets. Special food purchases by the district averaged \$19 per month. The director also reported this year that the district had purchased a microwave oven and microwave dishes at a total cost of \$215.

The director indicated that funds from sources other than the school nutrition program were used to purchase items associated with the preparation and service of meals to children with special needs. Special education funds were used to purchase special drinking cups.

Demographic Information for Selected Schools

Only one school in District G was selected for data collection due to the small size of the district and the fact that data were collected as a pilot study. This school housed kindergarten through second grade students. The school provided special education classes. The school had an enrollment of 825 and an average daily lunch participation of 702 children with approximately 41% receiving free or reduced price meals.

The school nutrition manager reported the number of children for whom specific diet modifications were made (Table G-1). The diets that required the most attention from the food service employees were the diabetic, low fat, and food allergy diets. Special education teachers provided good feedback about the appropriateness of the pureed diets received by the children in their classes.

School Costs**School Indirect Labor Costs**

The school nutrition manager was asked to estimate the time she spent in activities related to providing meals to children with special needs (Table G-3). The manager estimated that she spent approximately 9 hours per month (560 minutes) communicating with parents, teachers, and the district director about the special meals for the children. The second highest amount of time (600 minutes/month) was spent in working with the employees on the production of special meals. The manager stated that she spent 40 minutes per month providing assistance in feeding children. When questioned more about this, she stated that this time was spent in checking with the students and special education teachers to see if food was palatable. The total time per month the manager spent in administering the special meals program was approximately 24 hours (1447 minutes).



Table G-3. Estimated indirect labor time per month spent by school nutrition manager on activities related to providing meals to children with special needs

Activity	Manager School 1 minutes/month
Acquiring the physician's written diet order and communicating with physician	240
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	560
Meeting with special education teachers to develop IEP	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	7
Securing special food or equipment items	0
Coordinating training for food service staff or participating in workshop conducted by others	0
Providing assistance in feeding children	40
Observing consumption of special diets	0
Other activities	600
Total	1447



The amount of indirect labor time per child with a special food and nutrition requirement was 207 minutes per month or approximately 3 hours per child. This amount of time may have been inflated by the fact that the provision of modified meals was a new development in the district, and menu modification systems were still being developed. Important also was the fact that many of the parents did not return their menus on time at the beginning of the month, and the manager devoted considerable time to tracking down the menus so the children could be fed properly.

School Direct Labor Costs

Food service employees recorded the direct labor time required to prepare the pureed breakfast and lunch meals. Labor time required to prepare pureed breakfast meals averaged 8 minutes per meal (Table G-4). The mean additional direct labor time required to prepare a pureed lunch was 16 minutes.

Labor time for all the other special breakfast meals was 6 minutes for one child who received a diabetic meal on the last day of data collection (Table G-4). Other children either did not eat breakfast at school or their diets could be accommodated by substituting items already available on the breakfast line. For example, the child who required a low fat diet received dry cereal, dry toast, fruit, and skim milk each day. This menu required minimal additional labor time. The average time required to prepare other special lunch meals was 20 minutes per meal for children requiring diabetic, low fat, or food allergy modifications to their meals.

Table G-4. Labor minutes per meal for preparation of pureed meals and other special breakfast and lunch meals

	School 1 mean minutes/meal ^a
Pureed meals:	
Breakfast	8
Lunch	16
Other special meals:	
Breakfast	6 ^b
Lunch	20 ^b

^a Mean labor minutes per meal based on data collected for five days in each school.

^b Other special meals were diabetic, low fat, and food allergy.



School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Three cost averages were calculated based on five days of data: regular meals, pureed meals, and all other special meals such as diabetic, low fat, and food allergies. Food costs were compared by calculating the difference between the food cost of regular meals and the food cost of each of the two types of special meals: pureed and other. The cost comparison expressed as a percentage was calculated also. (Refer to page 9 in the method section for specific formulas.)

There was no difference in food cost between a regular and pureed breakfast (Table G-5). This is due to the fact that the same food was served. Pureed lunch meals were \$.02 more than regular lunch meals. This was due to the substitution of soda crackers for bread. The food service employees thought that pureed bread was not an acceptable product. The percent difference in cost for pureed lunches was 5% more than the cost of regular lunches. The percent difference was relatively high given such a small difference in cost because the total costs for both regular and pureed lunch were low. A potential cost was noted by that fact that a canned nutritional supplement, used to thin the consistency of one pureed lunch meal, was furnished by parents. If this supplement had been purchased by the school nutrition program, the cost would have increased by approximately \$2.30 for each lunch meal.

The cost of other special meals as compared to regular meals was \$.05 less for breakfast, and no cost difference was found for lunch (Table G-5). The percent difference in cost for the other special breakfast meals as compared to regular breakfasts was 10% less. The lower cost for other special breakfast meals was associated with the substitution of cold cereal and toast for more expensive breakfast entrees such as breakfast pizza.



Table G-5. Comparison of food costs for special meals and regular meals

	School 1 Food cost comparison ^a	
	\$	%
Pureed Meals:		
Breakfast	.00	0
Lunch	.02	5
Other special meals:		
Breakfast	-.05 ^b	-10
Lunch	.00 ^c	0

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b Other special food costs were associated with a low fat breakfast meal.

^c Other special food costs consisted of an average cost for diabetic, low fat, and food allergy meals.





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DISTRICT H

Demographic Information for District

District H consists of 14 schools with a student enrollment of about 10,500. Approximately 68% of the children who eat lunch receive a free or reduced price meal. The district operates a special school for severely developmentally disabled children. Disabled children also attend special classes in other schools.

Special Food and Nutrition Services

The district school nutrition director estimated the number of children for whom specific menu modifications were being provided in the current school year 1993-1994 (Table H-1). The director indicated that approximately 40-50 children in the school district required menu modifications. The majority of the students receiving special meals required milk allergy substitutions or pureed meals (38 of 43).

The district school nutrition director indicated that guidelines on meal service for special needs children provided by the State Department of Education were being utilized in the district. The director reported that neither she nor any of her staff were registered dietitians. When asked who was responsible for making the menu modifications to meet the special dietary needs of children in District H, the director responded that she worked with parents, the physician, nurse, or dietitians at local hospitals. Some parents of diabetic children work directly with the school nutrition manager to select menu choices for their child's diet. At the time of the research study, the director was planning menus for only one special diet, a low sodium/low potassium diet for a child with renal failure. The director used a diet manual and worksheet prepared by a local hospital dietitian as a guide to plan the special menu.

The district school nutrition program director reported that each manager was responsible for the assurance of accurate production of special diets and menu modifications. The school nutrition manager communicates with special education teachers to ensure that meals are pureed to the desired consistency. If children require assistance with feeding, special education aides provide this service in each school. The manager and special education teachers are responsible for the observation of consumption of special diets in the district. The manager also attempts to determine children's food preferences.

Communication

Principals and teachers at all schools are aware that special meals can be provided to students when requested by an approved medical authority. When parents request special diets for their children, they are referred by the principal or teacher to the district school nutrition director or school manager. The district nurse who works with the special education program also is aware of this



Table H-1. Prevalence of children requiring menu modifications

Special Meal	District	School 1	School 2
< ----- number of children ----- >			
Consistency modifications:			
Ground, regular	0	0	0
Pureed, regular	18	10	0
Other special modifications:			
Tube feedings	0	0	0
Diabetic	3	1	0
Low calorie	0	0	0
High calorie	0	0	0
Low fat/low cholesterol	0	0	0
Low sodium	1	0	1
Low protein	0	0	0
Milk allergies	20	0	1
Other food allergies	1	1	0
Between meal snacks	0	0	0
Other	0	0	0
Total	43	12	2

service and works directly with the district director. Local pediatricians have been informed that the district school nutrition program can provide special meals to children. Previously, the district school nutrition director has worked with one local doctor to provide meals for a diabetic child.

Training

The district school nutrition director indicated that two school nutrition managers previously had worked in hospitals and nursing homes. These managers trained the food service staff on preparation methods for pureed diets. The district school nutrition director conducted one-on-one training with the school manager who had the child on the low sodium/low potassium diet. The director reviewed the materials provided by the dietitian with the school nutrition manager. They discussed food items to be purchased, food items to avoid, and preparation methods for the low sodium/low potassium diet. The district director also indicated that the local health department had provided approximately



one hour and thirty minutes of training on special diets. Both school nutrition managers responded that neither they nor their staff had attended any workshops on providing meals for children with special food and nutrition requirements.

District Costs

District Indirect Labor Costs

The district school nutrition director was asked to estimate the amount of time each month that district office personnel spent in activities related to providing meals for children with special needs, and results are summarized in Table H-2. The district director spent over 5 hours (310 minutes) each month on these activities. The majority of her time was spent in activities related to communicating with students, families, principals, teachers, managers, and food service staff and planning meals. Additional time was expended in activities related to acquiring the physician's written diet order and conducting training of food service staff. Thirty minutes per month of clerical time were spent on activities related to planning meals which included typing special menus planned by the director. The total time per month spent by district office personnel in activities related to providing meals to children with special needs was over 5 1/2 hours (340 minutes).

District Direct Labor Costs

At the present time, the district is not contracting with registered dietitians or nutritionists to counsel students or to plan special menus. A dietitian was hired previously to work with a diabetic child and his/her parents. This dietitian was employed for two hours each month for six months. Dietitians from local hospitals have donated consulting time to help students with special needs. These services have been provided for two diabetic children. The dietitians assisted the district school nutrition director by checking the modified menus and counseling children's families.

District Food and Equipment Purchases

The district school nutrition director indicated that additional food purchases were being made to accommodate the diets of children with special needs. The majority of purchased food products were designated for the children who were on diabetic or low sodium diets. Special food purchases by the district averaged \$15 per month. Supply items such as divided plates with covers, at a cost of \$0.05 per plate, were being purchased for special meals at one school. Pureed and regular meals were packaged and sent to the special education classrooms for both breakfast and lunch. The director also reported that the district had not purchased any equipment solely for the preparation of special diets.



Table H-2. Estimated indirect labor time per month spent by district office personnel on activities related to providing meals to children with special needs

Activity	Director	Clerical	Total
< ----- minutes/month ----- >			
Acquiring the physician's written diet order and communicating with physician	40	0	40
Communicating with students, families, principals, teachers, managers, and food service staff and documenting all steps to provide special meals	133	0	133
Meeting with special education teachers to develop IEP	0	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	120	30	150
Getting bids on or purchasing special food or equipment items	0	0	0
Coordinating or conducting training of food service staff	17	0	17
Other	0	0	0
Total	310	30	340



The district school nutrition director indicated that funds from sources other than the school nutrition program have been used to pay expenses associated with the preparation and service of meals for children with special needs. Special education funds and grant money from the State Department of Health have been used to purchase a blender, bibs, high chairs, and feeding utensils.

Demographic Information for Selected Schools

The two schools in District H selected for data collection housed kindergarten through sixth grade students. School 1 also participated in an early education program for severely disabled children from infancy to five years of age. School 1 had an enrollment of 900 and an average daily lunch participation of 739 children with approximately 83% receiving free or reduced price meals. The school nutrition manager has a high school education and is State Department of Education certified. School 2 had an enrollment of 405 and an average daily lunch participation of 360 children with approximately 81% receiving free or reduced price meals. The manager at School 2 has a high school education and is State Department of Education and ASFSA certified.

The school nutrition managers reported the number of children for whom specific meal modifications were made (Table H-1). One diabetic child at School 1 received fresh fruit in place of dessert; thus, no special preparation was required. One child at School 2 was allergic to milk; however, juice was available at all meals so no special preparation was required.

School Costs

School Indirect Labor Costs

Each school nutrition manager was asked to estimate the time she spent in activities related to providing meals to children with special needs (Table H-3). Both managers indicated that the majority of their time was spent on communication with the students, families, principals, teachers, supervisors, and food service staff. The manager in School 2 reported that she spends 120 minutes each month going to the grocery store to purchase special food items. She also spends 48 minutes each month observing consumption of special diets. An additional 28 minutes is spent by the manager in School 1 training employees who are preparing the pureed meals. The school nutrition manager in School 1 is spending approximately 7 hours (428 minutes) or about 36 minutes per child each month on activities related to providing meals to children with special food and nutrition needs. The manager at School 2 is spending approximately 9 hours (528 minutes) or about 4 hours (264 minutes) per child each month on activities related to providing meals to children with special food and nutrition needs. The majority of this time at School 2 was devoted to activities related to the child on the low sodium/low potassium diet.



Table H-3. Estimate indirect labor time per month spent by school nutrition managers on activities related to providing meals to children with special needs

Activity	Manager School 1	Manager School 2
< ----- minutes/month ----- >		
Acquiring the physician's written diet order and communicating with physician	0	0
Communicating with students, families, principals, teachers, supervisors, and food service staff and documenting all steps to provide special meals	400	360
Meeting with special education teachers to develop IEP	0	0
Working with registered dietitians to plan special meals, planning meals, or working with parents to choose meals for their children	0	0
Securing special food or equipment items	0	120
Coordinating training for food service staff or participating in workshop conducted by others	28	0
Providing assistance in feeding children	0	0
Observing consumption of special diets	0	48
Total	428	528



School Direct Labor Costs

School 1 employees reported the direct labor time to prepare the pureed breakfast and lunch meals. Mean labor time required to prepare pureed breakfast meals was 6 minutes per meal (Table H-4). The mean additional direct labor time to prepare a pureed lunch was 7 minutes.

Additional labor was reported at School 1 for the delivery of packaged regular and pureed meals to special education classrooms. The district school nutrition director, school nutrition manager, and employee responsible for meal delivery indicated that the delivery of breakfast meals to special education classrooms occurred as the employee was reporting to her work station in the dining room; thus, an average time to transport breakfast meals was not calculated. Thirty seconds per meal was the average time required to transport the pureed and regular lunches to the special education classrooms.

Employees at School 2 reported the labor time required to prepare one special low sodium/low potassium meal. No pureed meals were prepared at this school. The average labor time for breakfast preparation of the special meal was 9 minutes. A mean of 24 minutes per meal was required to prepare special lunch meals. This labor time included preparation of meals based on the regular school menu that required minimum additional production and also meals different from the day's menu that required special production of food items. The school nutrition manager was very concerned about the health of the child on the low sodium/low potassium diet as the child had been in the hospital several times in previous months. The employees were aware of the importance of the diet to the child's health and were very conscientious in the preparation of her meals.

School Meal Food Costs

School meal food costs were calculated using cost information provided by the district. Three cost averages were calculated based on five days data: regular meals, pureed meals, and other special meals which was low sodium/low potassium. Food costs were compared at each school by calculating the difference between the food cost of regular meals and the food cost of each of two types of special meals. The cost comparison expressed as a percentage also was calculated. (Refer to page 9 in the method section for specific formulas.)

The average cost of a pureed breakfast at School 1 was \$.05 less than the cost of regular breakfasts (Table H-5). The percent difference in cost per meal for pureed breakfasts was 10% less than regular breakfasts. The percentages were high given such a small difference in cost because the total costs for both regular and pureed breakfasts were low. The less expensive breakfasts might be due to the use of oatmeal and grits in place of convenience products such as poptarts and sausage biscuits. The lower cost for pureed breakfasts occurred at School 1 even though on several days an extra carton of milk was used when food was pureed, and the price of this extra milk was added



Table H-4. Labor minutes per meal for preparation of pureed meals, delivery of special education meals, and preparation of other special breakfast and lunch meals

	School 1	School 2
	< ----- mean minutes/meal ^a ----- >	
Pureed meals:		
Breakfast	6	--- ^b
Lunch	7	--- ^b
Special education tray delivery:		
Lunch	.5	--- ^b
Other special meals:		
Breakfast	--- ^b	9 ^c
Lunch	--- ^b	24 ^c

^a Mean labor minutes per meal based on data collected for five days in each school.

^b This type of meal was not served in this school.

^c Other special meal was a low sodium/low potassium meal.

to the meal cost. The average cost of pureed lunches as compared to the cost of regular lunches in School 2 was \$.07 less. The percent difference in the cost per meal for pureed lunches was 8% less than the cost of regular meals. The less expensive lunches might be attributed to the substitution of canned for fresh fruits and vegetables.

Special meals for one child on a low sodium/low potassium diet were prepared in School 2. The cost of this special meal was \$.15 less than regular meals for breakfast and \$.77 more for lunch. The percent difference in cost per meal for the special meals as compared to regular meals was 30% less and 190% more for breakfast and lunch, respectively. Differences in cost at breakfast were associated with the substitution of oatmeal, eggs, and toast for breakfast products such as bagels, sausage biscuits, and blueberry muffins. Differences at lunch were primarily due to special food products such as boneless chicken breasts, low sodium cheese, low sodium bread, and frozen vegetables purchased from a local grocery store.



Table H-5. Comparison of food costs for special meals and regular meals

	School 1 Food cost comparison ^a		School 2 Food cost comparison ^a	
	\$	%	\$	%
Pureed meals:				
Breakfast	-.05	-10	--- ^b	--- ^b
Lunch	-.07	-8	--- ^b	--- ^b
Other special meals:				
Breakfast	--- ^b	--- ^b	-.15 ^c	-30
Lunch	--- ^b	--- ^b	.77 ^c	190

^a The following formulas were used for food cost information collected over a 5-day period in each school:

Food cost comparison (\$/meal) = average cost of special meals - average cost of regular meals

Food cost comparison (%/meal) = ((average cost of special meals - average cost of regular meals)/cost of regular meals) x 100

^b This type of meal was not served in this school.

^c Other special meal was a low sodium/low potassium meal.





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Appendix G

Worksheets for Determining Costs Associated with Providing Special Meals



**WORKSHEETS FOR DETERMINING MONTHLY COSTS ASSOCIATED
WITH PROVIDING MEALS FOR CHILDREN WITH SPECIAL
FOOD AND NUTRITION NEEDS**

All labor and food cost data collected are associated with providing special meals.

MONTHLY DISTRICT COSTS

INDIRECT LABOR COST:

Director

_____ minutes/month x \$_____ (hourly salary÷60) = \$_____ (a)

Area Supervisor/Dietitian

_____ minutes/month x \$_____ (hourly salary÷60) = \$_____ (b)

_____ minutes/month x \$_____ (hourly salary÷60) = \$_____ (b)

_____ minutes/month x \$_____ (hourly salary÷60) = \$_____ (b)

Clerical

_____ minutes/month x \$_____ (hourly salary÷60) = \$_____ (c)

TOTAL DISTRICT INDIRECT LABOR COST* (a+b+c) = \$_____ (d)

DIRECT LABOR COST:

RD Consultant

_____ hours/month x \$_____ hourly rate = \$_____ (e)

TOTAL DISTRICT DIRECT LABOR COST = \$_____ (e)

* If district school nutrition program provides benefits, these should be prorated and added.



MONTHLY SCHOOL COSTS

School _____

Month _____

INDIRECT LABOR COSTS:

Manager _____ minutes/month x \$ _____ (hourly salary÷60) = \$ _____ (a)

Clerical _____ minutes/month x \$ _____ (hourly salary÷60) = \$ _____ (b)

TOTAL SCHOOL INDIRECT LABOR COST* (a+b) = \$ _____ (c)**DIRECT LABOR COST:**

Pureed Meals:

_____ minutes/bkft x _____ # of pureed bkft meals/month = _____ minutes/month bkft (d)

_____ minutes/lunch x _____ # of pureed lunch meals/month = _____ minutes/month lunch (e)

(_____ d + _____ e) x \$ _____ (hourly salary÷60) = \$ _____ (f)

Other Special Meals:

_____ minutes/bkft x _____ # of other bkft meals/month = _____ minutes/month bkft (g)

_____ minutes/lunch x _____ # of other lunch meals/month = _____ minutes/month lunch (h)

(_____ g + _____ h) x \$ _____ (hourly salary÷60) = \$ _____ (i)

* If district school nutrition program provides benefits, these should be prorated and added.



MONTHLY SCHOOL COSTS, cont.

School _____

Month _____

Transport/Assembly:

$$\begin{aligned}
 & \text{_____ minutes/bkft} \quad \times \text{_____ \# bkft transport meals/month} & = \text{_____ minutes/month bkft (j)} \\
 & \text{_____ minutes/lunch} \quad \times \text{_____ \# lunch transport meals/month} & = \text{_____ minutes/month lunch (k)} \\
 & (\text{_____ j} + \text{_____ k}) \quad \times \$ \text{_____ (hourly salary+60)} & = \$ \text{_____ (l)}
 \end{aligned}$$

TOTAL SCHOOL DIRECT LABOR COST (f+i+l)
 = \$ _____ (m)

FOOD COSTS:

Pureed Meals

$$\begin{aligned}
 & \text{_____ Food cost pureed bkft} - \text{_____ food cost regular bkft} & = \text{_____ cost comparison (n)} \\
 & \text{_____ v} \times \text{_____ \# pureed bkft meals/month} & = \text{_____ \$/bkft (o)} \\
 & \text{_____ Food cost pureed lunch} - \text{_____ food cost regular lunch} & = \text{_____ cost comparison (p)} \\
 & \text{_____ x} \times \text{_____ \# pureed lunch meals/month} & = \text{_____ \$/lunch (q)} \\
 & \text{TOTAL PUREED MEALS FOOD COST (o+q)} & = \$ \text{_____ (r)}
 \end{aligned}$$

Other Special Meals

$$\begin{aligned}
 & \text{_____ Food cost other bkft} - \text{_____ food cost regular bkft} & = \text{_____ cost comparison (s)} \\
 & \text{_____ aa} \times \text{_____ \# other bkft meals/month} & = \text{_____ \$/bkft (t)} \\
 & \text{_____ Food cost other lunch} - \text{_____ food cost regular lunch} & = \text{_____ cost comparison (u)} \\
 & \text{_____ cc} \times \text{_____ \# other lunch meals/month} & = \text{_____ \$/lunch (v)} \\
 & \text{TOTAL OTHER MEALS FOOD COST (t+v)} & = \$ \text{_____ (w)} \\
 & \text{TOTAL FOOD COSTS (r+w)} & = \$ \text{_____ (x)}
 \end{aligned}$$



WORKSHEET SUMMARY**DISTRICT COSTS**

Indirect labor cost/month (d) \$ _____

Direct labor cost/month (e) \$ _____

TOTAL (d+e)
\$ _____**SCHOOL COSTS**

Indirect labor cost/month (c) \$ _____

Direct labor cost/month (m) \$ _____

Food cost/month (x) \$ _____

TOTAL (c+m+x)
\$ _____**SCHOOL COSTS**

Indirect labor cost/month (c) \$ _____

Direct labor cost/month (m) \$ _____

Food cost/month (x) \$ _____

TOTAL (c+m+x)
\$ _____**TOTAL LABOR AND FOOD COSTS/MONTH**

\$ _____

